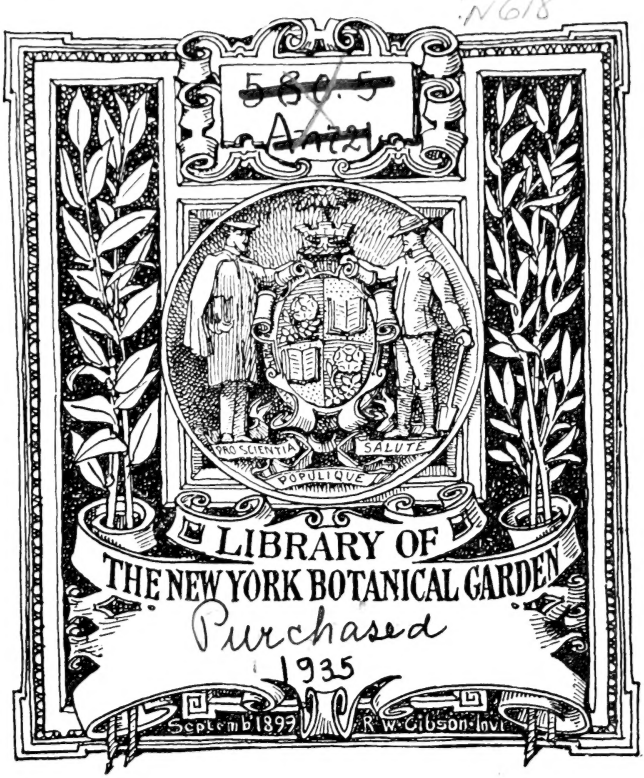
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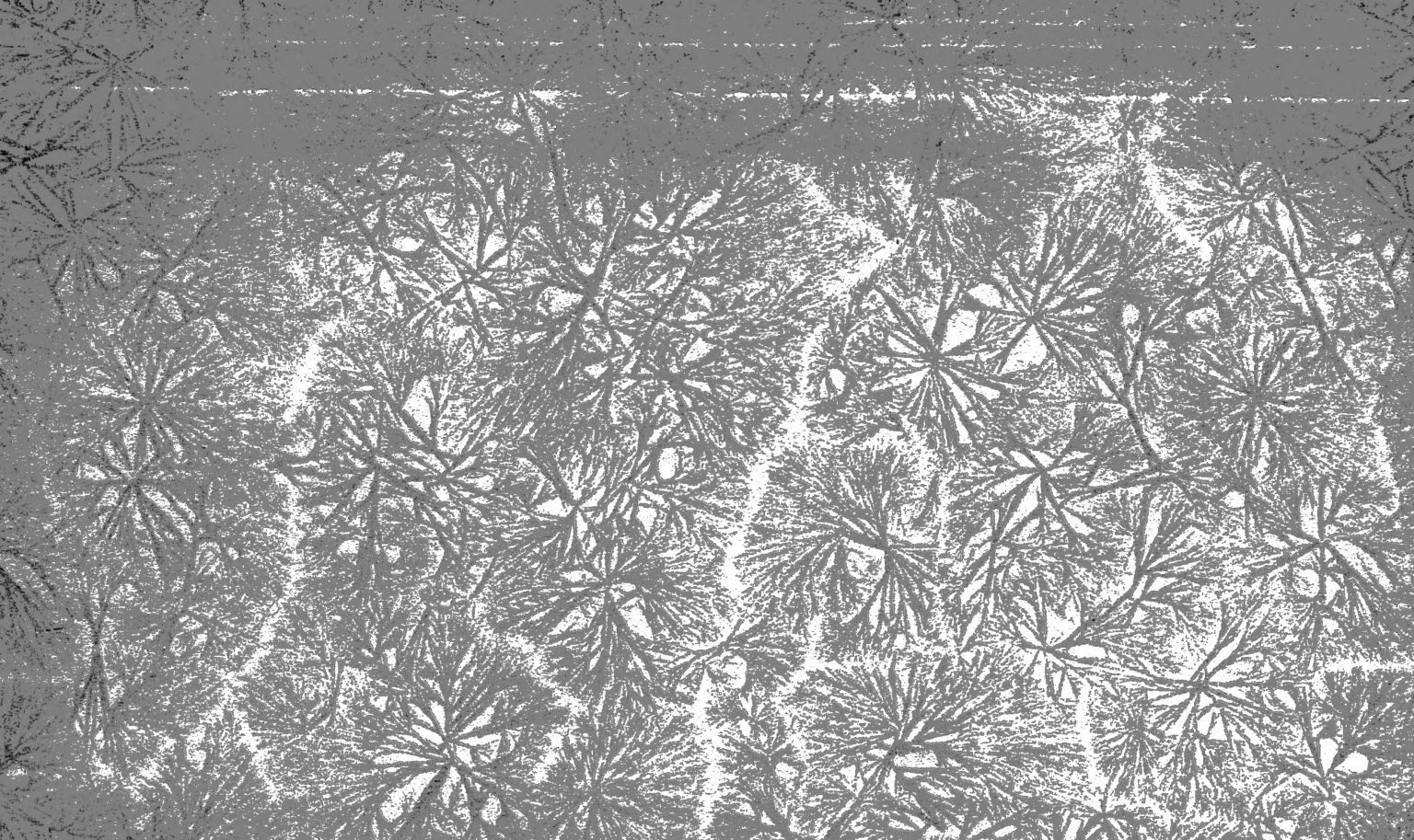

ANNALS OF NATURAL HISTORY;

OR,

MAGAZINE

OF

ZOOLOGY, BOTANY, AND GEOLOGY,

(BEING A CONTINUATION OF THE 'MAGAZINE OF ZOOLOGY AND BOTANY,' AND SIR W. J. HOOKER'S 'BOTANICAL COMPANION.')

CONDUCTED BY

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1839.

"Omnes res creatæ sunt divinæ sapientiæ et potentiæ testes, divitiæ felicitatis humanæ: ex harum usu *bonitas* Creatoris; ex pulchritudine *sapientia* Domini; ex œconomia in conservatione, proportione, renovatione, *potentia* majestatis elucet. Earum itaque indagatio ab hominibus sibi relictis semper æstimata; a vere eruditis et sapientibus semper exculta; male doctis et barbaris semper inimica fuit."—LINN.

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PLATES.

ERRATA.

Page 139, line 31, *omit the words* (in conjunction with Prof. Muller).
— 142, line 32, *omit* Charles.
— 166, line 10, *for Collema* and *Bœomyces* as specimens; however, if *read Collema Bœomyces*; as specimens, however, of.
— 166, line 3 from bottom, *for* thecæ *read* theca.
— 227, line 5 from bottom, *for* Lison *read* Linn.
— 350, line 18, *after* Australia *add* and the Islands of the Indian Archipelago.

ANNALS OF NATURAL HISTORY.

I.—*On the Production of Vanilla in Europe.* By Professor Charles Morren, of the University of Liége, Member of the Royal Academy of Sciences of Brussels, &c.*

THE natural history of Vanilla cannot have too many facts brought in aid of its illustration, because it is to be remarked that all the relations of travellers with regard to this plant serve rather to perplex than to throw light upon the subject. Having been fortunate enough to obtain two years since, and at two different times, an abundant crop of this interesting fruit, I believe I may assert that henceforth we may produce in Europe vanilla of as good a quality (if not better) as that which is exported from Mexico. This result is owing to the progress that vegetable physiology has made during these last few years, for, without an exact knowledge of the organs and of their functions, the fruit of this plant could never have been obtained; on this account this new culture deserves particular attention. In the second place, the experiments made at the Botanic Garden of Liége upon the fecundation of the flowers of the *Vanilla* have revealed several new facts in the physiology of the reproduction of plants. And, as regards the distinction of species, my inquiries may moreover serve to establish better diagnoses between the plants of the genus *Vanilla*, at the same time that they tend to prove that the latest works that treat of these species are far from giving correct information respecting the origin of the vanillas most in demand in commerce. Lastly, my experiments may afford the most convincing proof, that in our own climate, but in our hot-houses, the same circumstances of the ambient atmosphere as those which exist under a Mexican sky, produce in the vanilla plant all the phænomena of a good and perfect maturation of the fruit.

* Read before the British Association at Newcastle, and since communicated by the author to, and translated for this Journal.

§ I. *Of the species of Vanilla Plant which produces the long and fine pods of Commerce.*

Were we to believe most authors, (and I may even go so far as to say all) the *Vanilla aromatica* of Swartz, described by Robert Brown in the 'Hortus Kewensis' (vol. v.), would be the only one which produces the vanilla of commerce. This should have been the species introduced into Europe in 1739 by Henry Philip Miller; but it appears that it is not at all to be found at the present time in England, for I sought for it in vain in the gardens of London and its environs. I did not see it at Kew. It appears moreover that several species are confounded under this name, as M. Schiede has already pointed out in his *botanical observations* made in Mexico (Linnæa, vol. iv. 1829, p. 554—583), for, as he says, in Kunth's 'Synopsis,' we find assembled under this name Mexican species and others from Southern and Western America. The character which has been assigned to it of having nerved leaves (*foliis nervosis*) may possibly have arisen from bad culture, for in this case the *Vanilla planifolia* also has nerved leaves; or because dry leaves have been examined; for then again the leaves of the *Vanilla planifolia* are no longer smooth, but much wrinkled longitudinally, that is to say nerved. In short, the assertion that the pods of the vanilla of commerce are produced by the *Vanilla aromatica* rests upon no certain or known fact, but in a great measure upon the belief which existed that the *Vanilla planifolia* bore no odoriferous fruit, a thing which my own researches have proved to be completely false.

It is singular that there is not a better agreement with regard to the *Vanilla planifolia*, especially since the publications of M. Schiede. This botanist thinks that two distinct species are confounded under this name, both of which he found in Mexico; the one, the *Vanilla sativa*, Schiede, the leaves of which are oblong, succulent, the bracteæ small, and the *fruit without grooves*; and the other, the *Vanilla sylvestris*, Schiede, the leaves of which are oblong-lanceolate, succulent, the bracteæ small, and the *fruit with two grooves*. It is to be regretted that M. Schiede should have confined him-

self to these differential characters, so far from certain as to leave much doubt in the observer's mind, for he avows not having seen the flowers of any one species of *Vanilla*, and it is in the flower alone, and especially in the labellum, that the true characters are to be sought. There are in the hothouses of Mr. Loddiges of London two kinds of Vanilla plant referred to the *Vanilla planifolia* of Andrews, to which these characters equally apply, and which are nevertheless very different, insomuch that the one has the leaves oblique and the other regular. It is moreover very doubtful, whether in the genus *Vanilla* all the fruits have not two grooves, which are the traces of the lines of dehiscence or of the sutures. These sutures also exist to the number of two upon the fruits which I saw upon the *Vanilla bicolor* at Mr. Loddiges, and which have recently been described by Professor Lindley.

From the form of the fruit of the Vanillas cultivated at Liége, it seems to me that the *Vanilla planifolia* of Andrews (Repository, vol. viii. pl. 538.), figured in his plate 538, is really the *Vanilla sylvestris* of Schiede; but I am not very sure of it, because the characters assigned to the *Vanilla pompona* of this latter author, and especially that of the size of the fruit, agree equally with the *Vanilla* of Liége; so that here again the want of all criterion drawn from the flower destroys any kind of certainty which might be had upon this subject. What is very certain is, that the *Vanilla planifolia* of the herbarium of Professor Lindley, although marked with a note of interrogation (?) is the very same plant drawn in flower by Mr. Francis Bauer in Lindley's 'Genera and Species of Orchideous Plants'; secondly, that this species is certainly the one which was figured by Andrews; and thirdly, that it is this same plant which, generally cultivated, on the continent, has produced at Liége an abundant crop of odorous and delicious fruit.

Hence, it follows:

1st. That the characters of the species of *Vanilla* named by M. Schiede *V. sativa*, *V. sylvestris*, *V. pompona*, should be submitted to a fresh examination, and that no sure distinction can be established except upon the flower, which has not yet been observed.

2nd. That whereas Andrews states that his *Vanilla planifolia*

is that of Plumier described in the unpublished collection of his drawings as having reddish fruit (*fructu corallino*) and short (*breviori*), and as having white flowers, there is an error either on the part of Plumier or of Andrews; for the fruits of the species figured as the *Vanilla planifolia* are extremely long (2 decimetres), and its flower is not white but green.

3rd. That the *Vanilla planifolia* of Andrews bears fine and good odoriferous fruit as long as the finest sort to be found in commerce, and that consequently this species, already much spread, may become very important, whether for cultivation in our hot-houses or for introduction into the intertropical colonies, two objects which merit as well the attention of private individuals as the protection of governments.

§ II. *An Abstract of the History of the* Vanilla planifolia *bearing large odoriferous fruits.*

I have followed Robert Brown's 'Vermischte botanische Schriften' (vol. ii. p. 48.) in attributing (in a notice respecting the indigenous Vanilla plant lately published at Brussels in the Bulletins of the Royal Academy of Sciences of Belgium, tom. iv. No. 5.) the introduction of *Vanilla planifolia* to the Honourable Charles Greville in 1800; but I have learnt here, at Newcastle itself, that this is a mistake. The useful Vanilla plant was first introduced into Europe by the present Duke of Marlborough, then Marquis of Blandford; but it is true that this interesting species was at first cultivated in the Honourable Charles Greville's choice collection of plants at Paddington, near London, where it flowered for the first time, but then no artificial fecundation having been performed no fruit was produced. In 1807 Mr. Bauer figured a new flower of this species from nature, together with one fruit; but the colour of the latter and its structure leave me some doubt whether this drawing was not made from a specimen of commerce, and there is nothing to authorize our believing that at this period the art of producing fruits in the *Orchideæ* was yet known.

The *Vanilla planifolia* was carried in 1812 from the gardens of Mr. Greville into those of Belgium, and it was M. Parmentier of Enghien who introduced the plant at Antwerp, where it was confided to the care of Dr. Sommé, the director

of the Botanic Garden. The plant grew rapidly there, and slips were sent to all the towns of Belgium and of France, but they very rarely flowered; once or twice in Flanders at the seat of Madame la Vicomtesse Vilain XIV., and at Liége; but fruit was never obtained, so that this culture was despaired of. Nevertheless, in 1819, M. Sommé sent two plants of *Vanilla* to M. Marchal, now Curator of the Bibliothèque de Bourgogne at Brussels, that he might send them to the Dutch colonies of Java, where it was said the plant might become valuable by its produce.

The history of this migration of the Vanilla plant from America to the East Indies is too interesting not to be made known, because it brings to mind in every respect the episode of the transportation of the plant of the coffee tree taken from the hot-houses of Amsterdam, given to Louis XIV. and father of the three plants, one of which was taken to the French Antilles by Captain Declieux, who, in a scarcity of water experienced by the ship's crew, shared the small quantity which he had to drink between himself and his dear coffee plant. Indeed, only one of the Vanilla roots stood the passage from Belgium to the East Indies; but it was only by the greatest care in preserving it from the rough treatment of the sailors, from the changes of temperature, and from the salt water which was thrown upon it. It would undoubtedly have perished if M. Marchal had not made it his darling child. The plant so happily saved was given to the Botanic Garden of Buitenzorg at Java, and prospered there so well that it flowered; and it is without doubt, that which was afterwards described by Dr. Blume, who on account of its green flower named it *Vanilla viridiflora*; so that this name should also be regarded as a synonym of the specification, already so perplexed, of this species.

The observations on the necessity of an artificial fecundation in the greater part of the orchideous plants not being known at that time, the flowers of this *Vanilla* bore no fruit in the East Indies, which I attribute to the absence of the species of insect which nature has doubtless given to the climate of Mexico to effect in this latter region a fecundation, which man alone, by a study of the organs, is able to perfect in other countries.

It was in 1836 that by a peculiar horticultural treatment we had at Liége upon one Vanilla plant fifty-four flowers, which having been fecundated by me, produced the same number of pods; and in 1837 a fresh crop of about a hundred pods was obtained upon another plant by the same methods; so that now there is not the least doubt of the complete success of this new cultivation.

§ III. *Short Digression on the Introduction of Vanilla into domestic use.*

From the works of the illustrious Alexander von Humboldt we learn that the Mexicans were already in the habit of perfuming their chocolate when the Spaniards discovered this part of America. It seems, however, by the accounts which I have read of the first travellers in this region, that the American chocolate was a detestable beverage to which the Europeans afterwards gave an exquisite flavour. Chocolate was brought from Mexico into Europe in 1520, but it appears that vanilla was brought to the continent as a perfume about the year 1510, at the same time as indigo, cochineal, and cacao itself, that is to say, ten years before the arrival of tobacco. Nevertheless, as I have elsewhere said, 'Notice sur la Vanille,' Bruxelles, in spite of its perfume, so sweet that Salisbury at a later period called the plant *Myrobroma*, vanilla cannot have acquired a very great popularity about that period; for Claude d'Abbeville, whose singular 'History of the Mission of the Capuchin Fathers in the Island of Maragnan and the neighbouring lands,' published in 1614, I have consulted, says nothing of this plant, although he devotes an especial chapter to the history of the vegetables which are useful or curious, as the pine apple, of fruit trees, as the palm tree, &c. At a much later period it engaged but very slightly the attention of travellers, and I shall quote among others Father Gurailla, who in his 'Natural, Civil, and Geographical History of the Nations inhabiting the banks of the Orinoko,' mentions the vanilla (*Bagnilla*) merely as being a sarmentose plant always green and twining itself around trees.

In 1703, vanilla was better known from the writings of Charles Plumier. At that time its use was diffused over the

continent; and in 1773 Fusée Aublet described the preparations of this fruit, which subject M. Schiede resumed in 1829. At the present time it is an important object of the commerce of the Mexicans, as may be learnt from the works of M. von Humboldt.

§ IV. *Detailed Description of the Cultivation of the Vanilla.*

I find that the *Vanilla planifolia* is as common in the gardens of the British Islands as in those of the continent, but the complaint there generally is that it very rarely flowers. I attribute this want of flowering to two causes; 1st, that almost everywhere the plants are too small, too young, and that they are not allowed to grow freely in the most lofty heated and humid houses; 2ndly, that a peculiar culture is not bestowed on them. I shall try to make good these two assertions.

The Vanilla plant in order to flower should be at least five or six years old. The older and larger it is, and the more branches it has, the better and more abundantly it will flower. Nevertheless, the number of flowers is not in direct proportion to the vigour of a plant; for I have two plants thirty feet high, but perhaps about a hundred feet long, one of which is much more feeble and sickly than the other, and the weakest bears more flowers than the stronger one. The quantity of flowers has more relation to the situation than any other circumstance; but in general old plants are necessary, and horticulturists are quite wrong in throwing away their old plants.

Secondly.—I have found by experience that the best method of cultivating the Vanilla is the following:

The *situation* should be shady; being behind and around palm trees and Dracænas, &c. suits it, at the back part of the hot-house, getting sun at intervals, although the sun is not necessary for ripening the fruit. Shade, heat, and humidity are three requisites for obtaining flowers.

The *soil* which I have found the best is simply *coack* or burnt coal, without mixture of earth, and above white wood poplar, or birch, crushed and reduced into small pieces; frequent watering; an iron column, a stem of *Dracæna*, or any other support will aid the climbing of the plant, which sends

forth numerous aërial roots without giving it the quality of a parasite. In fact, *Vanilla* is not in the least a parasitical plant.

The *culture* consists in twining the branches, cutting, and burning them at their extremity with a hot iron: everything that contributes to stop the sap serves to bring it into flowering state. If a plant blossoms and its flowers are not fecundated, it bears new flowers in the following year; but if it has produced fruit, some years of rest are necessary before it flowers again. The time of its flowering is from February to April, and when it bears fruit they need exactly a year and a day to ripen: this fact has constantly been confirmed at Liége. As the fruit ripens, it falls, and maturation takes place without the aid of the plant.

§ V. *On the Structure of the Flowers of the Vanilla Plant.*

The flower of *Vanilla* has this peculiarity—that the retinaculum is highly developed, so that this organ forms a curtain suspended before and above the stigmatic surface, thus separating it completely from the anther, which in its turn incloses in two cavities, naturally shut, the pulverulent masses of pollen. From this structure it results, that all approximation of the sexes in this orchideous plant is naturally impossible. It is thus necessary either to raise the velamen or to cut it when the plant is to be fecundated, and to place in direct contact the pollen and the stigmatic surface. The fecundation never fails, and we may be convinced of its success by observing the flower some hours after the operation. If impregnation has been effected, the petals and sepals reverse inwardly, and the flower droops instead of remaining erect. So soon as the following day the ovarium elongates.

I followed the development of the pollen tube through the columnar tube and at the septa only to the ovules; but what is remarkable is, that it requires three weeks before the pollen tube seizes the nucleus of the ovule. The formation of this latter part is easily studied in this species, and I have verified on this plant the profound researches of Robert Brown, which are of the greatest accuracy.

The direct results of this memoir therefore go to prove that

in all the intertropical colonies vanilla might be cultivated and a great abundance of fruit obtained by the process of artificial fecundation; and secondly, that in all our hot-houses this culture would succeed quite as well as that of the Ananas, and would undoubtedly become more profitable. It is a subject which well deserves attention in a commercial point of view; and is moreover a proof of the importance of science for improving every branch of industry.

II.—*On the Goniatites found in the Transition Formations of the Rhine.* By M. Ernest Beyrich*.

[With Plates.]

We are indebted to M. Leopold von Buch for the establishment of a decided and precise separation between the *Ammonites* and the *Nautili*†. He has pointed out what must be considered an essentially different organization in the former of these Cephalopods: in fact, the siphuncle does not penetrate the transverse plates as in the *Nautilus* and other kindred genera, with the single function of fixing the animal strongly to the shell, but is prolonged between the chambers and the shell, as a much more important organ, and like a solid ligament surrounds the animal to the very extremity of the exterior.

The *Goniatites* must be considered as one division of the *Ammonites*; they are the representatives of the genus in the oldest fossiliferous rocks of the transition formations and of the carboniferous strata. The *Goniatites* are distinguished from the *Ammonites* by the more simple divisions of the chambers which are not denticulated like the leaves of a flower, and have lobes following a law less simple and precise than that which governs the formation of the more recent *Ammonites*. In some species indeed the lobes are scarcely perceptible, and they might be mistaken for *Nautili*, if it were not for the dorsal lobe, which necessarily accompanies the dorsal siphuncle. The greater part of the *Goniatites* have but one lateral lobe, which is sometimes greatly rounded, sometimes angulose and infundibuliform, and sometimes linguiform. When there

* This memoir appeared as a pamphlet in 1837 at Berlin; the present translation is from the French in the 'Annales des Scien. Nat.' vol. x. p. 65. 1838, carefully corrected from the German original.

† See Annales des Sciences Naturelles, 1st Series, t. xxix.

are two or more lateral lobes, they are mostly linguiform, and extend from the back quite to the suture, increasing and diminishing in a regular manner; or they present an irregular form, without following any law.

The *Goniatites* are extensively distributed in the transition formations; they are found in very large quantities in the old transition limestone of the Fichtelgebirge. Count Münster has described a great number of species of that locality*, and they ascend and appear even in the superior beds of the carboniferous measures, properly so called, where they are found amidst the debris of a mighty vegetation, the sole and last remains of the animal kingdom. In the limestone of the Fichtelgebirge, they occur with *Trilobites*, *Orthoceratites* and *Clymeniæ*: the *Trilobites* and *Orthoceratites* ascend as far as the carboniferous measures; the *Clymeniæ*, on the contrary, which differ from the *Goniatites* in the position of the siphuncle, and ought to be considered as true *Nautili*, have not hitherto been found either in the carboniferous limestone or in the recent transition formations, amongst which the schistose rocks of the Rhine arrange themselves †.

The great number of *Goniatites* now discovered renders it necessary to divide them into natural groups. M. von Buch, who was acquainted with very few species compared to the number at present known, divided them, first, into *Goniatites with lobes rounded*, and *Goniatites with angulose lobes*; afterwards in each of these sections, he separated those which have a simple dorsal lobe, and those which have the dorsal lobe divided. I think this mode of classification should be discarded, because it appears to me that the character upon which the secondary divisions are founded, that of a simple or divided dorsal lobe, has a more immediate relation to the interior organization of the animal, and is consequently of much greater importance, than the difference between rounded and angulose lobes, which cannot be established with precision. We can very plainly distinguish by the form and number of the lateral

* See Annales des Sciences Naturelles, 2nd Series, t. ii.

† Since the publication of this pamphlet, an article appeared in the Cambridge Phil. Trans. 1838, by Dr. T. Ansted, describing the genus *Clymenia* which occurs in the slate rocks of Cornwall. The name is there changed to *Endosiphonites*, *Clymenia* being already appropriated.

lobes, four sections among the *Goniatites* with the simple dorsal lobe, and two amongst those with the dorsal lobe divided, that follow however a determinate law in their geognostic distribution. To these six proposed sections, among the *Goniatites* properly so called, might perhaps be added as a seventh the *Ceratites* of the muschelkalk: they are undoubtedly more nearly allied to the *Goniatites* than on some *Ammonites* of the more recent formations. The *Goniatites* and *Ceratites* united, would stand opposed to the *Ammonites*, and might like them be divided into several natural families.

Before I proceed to the individual description of the different species, I consider it necessary to explain the determination of the proportions of these fossils, characteristics introduced for the first time into the science by M. von Buch, and of which I have also availed myself in the description of the several species. The increase in diameter, the height of the spire, or more simply the height, expresses the proportion in which the height of the mouth increases in the space of an entire whorl. The height of the mouth is measured on two succeeding whorls, and the lesser of these dimensions is put down as a decimal fraction of the greater, which is taken for unity. The height of the mouth may be estimated in two ways: by taking the perpendicular dropped from the middle of the back, either as far as the suture or as far as the middle of the back of the preceding whorl. As the degree of involution in the outer circles is always the same as in the inner circles, we ought by these two estimations to obtain the same result for the increase in height. The increase in breadth, or simply the breadth, expresses the proportion in which the breadth of the mouth (that is to say, the dimension perpendicular to the height) increases in the space of an entire whorl —measure again here the breadth on two whorls which cover each other, and set down the lesser number as a decimal fraction of the greater. The increase in height and the increase in breadth are very certain proportions for the different species; taken together with the involution, these characters completely determine the form of an Ammonite. The thickness which expresses the proportion between the height and the breadth of the mouth depends on the two first proportions; it varies in each respect whenever the height (and

that happens almost constantly) does not increase in the same proportion as the breadth. For this reason I have entirely neglected its determination; moreover, for the distinction of the several species, we must not attach to these numerical proportions a greater degree of importance than they really deserve. If, in general, questions concerning organic bodies cannot be mathematically determined, we may with still greater reason in the present instance disregard little discrepancies; dealing as we are with fossils, the imperfect preservation of which seldom permits a great degree of accuracy of admeasurement.

Section I. Nautilini.

The dorsal lobe simple, infundibuliform or linguiform; there is *one* single lateral lobe, smooth and rounded, which sometimes disappears entirely.

1. *Ammonites subnautilinus*, Schlotth.

A. Nœggerathi, *Goldf. and Von Buch, Goniat.* Pl. I. fig. 6—11.
? A. evexus, *L. von Buch, Goniat.* p. 33. Pl. I. fig. 3—5.

The dorsal lobe infundibuliform; depth equal to two or three times the breadth. The lateral lobe is large, occupying the whole extent of the side, it even descends nearly the whole depth of the dorsal lobe, and returns towards the suture, with a somewhat greater inclination, to the height of the dorsal saddle*. The increase in height is 0·5 to 0·55; the increase in breadth 0·68 to 0·72; there are 14 chambers in one complete whorl. The number of whorls is 6 or 7: the inner whorls are almost entirely enveloped, never more than one fourth of them being perceptible.

M. von Buch has already observed, that the *A. Nœggerathi*, Goldf., does not essentially differ from the *A. subnautilinus*, Schl. In these two Ammonites the lobes have a form altogether similar; the height and the breadth scarcely differ, and the somewhat less complete involution of *A. Nœggerathi* will scarcely suffice to constitute a variety: still less can the more discoid form of the latter be regarded as a distinctive character. We must be very cautious in the appreciation of the exterior form, and in the use of that characteristic for the di-

* The word *saddle* is used to denote those separations between the lobes upon which the mantle of the animal is supposed to have rested. For further explanation see Dr. Buckland's Bridgewater Treatise, page 363, note.

stinction of species, where, as in this case, the height and the breadth increase in entirely different ratios. A necessary consequence of the more rapid increase in height than in breadth is, that according to the law of geometrical progression, the thickness in the outer whorls diminishes very rapidly also, and it follows that the ammonite in its growth takes a form more and more discoid. In the *A. subnautilinus* the difference between the increase of height and that of breadth is already great enough to render this character very evident. It appears to me that the fragment described by M. von Buch, under the name of *A. evexus*, ought to be restored to the present species; it presents no character that permits the establishment of a specific distinction between them. In the *A. subnautilinus*, as in this, the transverse plates are elevated in the middle, and their greatest depth found to be on the edges near the lobes.

The *A. subnautilinus* is met with in the limestone of the Eifel near Gerolstein, and in the state of pyrites in the clay slate of Wissenbach (*Thonschiefer*). From these two localities I have at present seen only casts. The pyritose fossils of Wissenbach are almost always in the state of casts, and if any striæ are visible they must be considered as belonging to the interior side of the shell, which was probably very thin.

2. *Ammonites lateseptatus*, n. s. Pl. I. figs. 1, 2, 3, 4.

The dorsal lobe infundibuliform; not much deeper than broad. There is no lateral lobe properly so called, that lobe being only indicated, in the early period of its growth, by an imperfect curve in the septa of the chambers. The increase in height is 0·70, the increase in breadth 0·65. There are but 10 or 11 chambers in one whorl. The number of whorls is 7, only a third part of the interior whorls is visible.

This ammonite is found with the preceding, in the clay slate of Wissenbach; it is well characterized by its form and by its lobes. As the height does not increase faster than the breadth, but rather more slowly, the thickness of the ammonite is not diminished in the exterior whorls, but is even somewhat increased. Figs. 1 and 2 of Pl. I. represent the finest example that I possess; there is very nearly a whorl and a half

without a transverse plate. In order to see the lobes, one must take off a part of the last whorl, as is shown in fig. 2. In the outer whorls the breadth of the opening at the mouth is considerably greater than the height; consequently the side is very narrow, and the dorsal saddle, which is large and rounded, can scarcely be distinguished. The form of this ammonite would be perfectly spherical, if the inner whorls were not partly disengaged, and thus form a large and deep umbilicus. Upon the last whorl, destitute of transverse plates, the side falls towards the interior in an obtuse angle, presenting a well-defined ridge: this ridge is wholly wanting in the interior whorls. The increase in breadth being more rapid than the increase in height occasions the thickness in the inner whorls to be a little less than that of the outer ones. The back is also smaller in consequence, and the side more flat and more distinctly separated from the back. For this reason also the lateral lobe in the inner whorls is indicated on the side by an imperfect curve of the transverse plate, whilst in the outer whorls the dorsal lobe widens, and extends over the back in such a manner that it has properly speaking no existence, except as a large and rounded dorsal saddle.

In fig. 3, Pl. I. the lobes are represented as they begin to appear at first, in the specimen shown in figs. 1, 2, with a whorl and half destitute of transverse plates; in fig. 4 are the lobes of another specimen, of which only the three innermost whorls are preserved. The shell of this ammonite was striated, as may be distinctly seen upon the cast: the striæ are inflected behind, upon the back, according to the ordinary law for *Goniatites*, forming a very deep curve. I have chosen the name *lateseptatus* on account of the considerable distance of the transverse plates from each other, which is so great that there are only 10 or 11 of them in one whorl, whilst in general 14 seems the lowest limit for the number of transverse plates of the *Goniatites*.

3. *Ammonites Dannenbergi*, n. s. Pl. I. fig. 5. *a*, *b*.

The dorsal lobe infundibuliform, the depth twice as great as the breadth; the lateral lobe sinks a little deeper than the dorsal lobe; it entirely occupies the side and ascends towards

the suture, but not quite to the height of the dorsal saddle. The increase in height is 0·28; the increase in breadth 0·5. There are 18 chambers in one whorl. The interior whorls are not at all enveloped, but entirely free. The only specimen that I am acquainted with is in the beautiful collection of M. Dannenberg at Dillenburg; the figure is taken from a model in plaster. It is a fragment of which only two whorls are preserved; it wants the interior whorls and the outer unchambered part. The form is completely discoid, from its more rapid increase in height than in breadth. This ammonite is thus distinguished from the *A. expansus*, which has the whorls entirely enveloped. In the latter the height increases still more rapidly, yet has less disproportion with the increase in breadth. If we suppose that in this ammonite, according to the ordinary law, there is a whorl and a half without chambers, it will be found from the proportion of the increase in height, that the diameter of the entire shell would be nearly a foot. The thickness ought in this species to diminish very rapidly, since the breadth of the mouth increases much more gradually than the height. The dimension is, at the commencement of the first of the two whorls preserved, 0·7; at the commencement of the second, 1; and at the termination of the second, 1·5. The greatest thickness is at the middle of the side; it decreases however, but gently, till approaching the suture and the back. Upon the outer of the two whorls the back is completely rounded, and passes gradually to the side. Upon the inner whorl it becomes flat, and at the commencement of the second whorl it forms almost a right angle with the sides. Probably there was upon the shell, between the back and the two sides, two sharp edges, the impression of which may be seen upon the cast. These edges limit the inflected curve behind, which is formed by the striæ of the shell and the back: they gradually disappear upon the outer whorls. We shall see in many of the following species this difference in the manner in which the back is united to the sides, in the exterior and interior whorls. The lobes of *A. Dannenbergi* are not essentially different from those of *A. subnautilinus*. The dorsal saddle is always somewhat narrower and higher; the lateral lobe, on

the contrary, is a little deeper: the last rises evidently to form a lateral saddle. It does not ascend, as in *A. subnautilinus*, quite to the suture, and is not cut off in an abrupt manner, but inflected considerably upon the side. (See M. von Buch, fig. 3 and 9. pl. I.) This difference is because in *A. subnautilinus* each saddle that unites the lateral lobe with the flat ventral lobe, which exists in that ammonite, is compressed beneath the suture, in consequence of the decided envelopment of the interior whorls.

4. *Ammonites compressus.* Pl. I. fig. 6 *a*, *b*.

Spirula compressa, *Goldf. Dechen Geogn.* p. 536.

Gyroceratites gracilis, *H. v. Meyer. Act. Nat. Cur.* 1831. XV. II. p. 59.

Bronn. Leth. geogn. p. 102. pl. I. fig. 6.

The dorsal lobe very small, infundibuliform, two or three times as deep as broad. The lateral lobe is almost entirely wanting, or at most only indicated by a very imperfect curve on the transverse plates of the chambers. The increase in height is 0·3, the increase in breadth 0·5. There are 15 chambers in a whorl; the number of whorls is from 4 to 5. This ammonite has not any part enveloped; the innermost whorls are entirely free.

It is not an unfrequent fossil in the clay slate of Wissenbach (Thonschiefer), nevertheless the specimens are seldom well preserved: they often want the innermost whorl, and frequently the exterior portion or that destitute of chambers. This must have been the reason why Goldfuss called it a *Spirula*, and H. von Meyer made it a distinct genus, under the name *Gyroceratites*. The lobe distinctly exists, though certainly small, and proves it to be really a Goniatite. The whorls are by no means separated one from another, as in the *Spirula*, but in contact with each other, although but slightly. The greatest thickness is in the middle of the side, which gradually diminishes, both towards the back and towards the suture, in such a manner that the section of the mouth is an ellipsis. One consequence of this is, that in the casts where the shell is wanting there is really a little interval between the whorls; that space appears still larger if the particles of schist between these whorls have not been taken off with sufficient care.

The drawing given by Bronn in the 'Lethæa geognostica' has certainly not been taken from nature, but probably from the description of H. von Meyer. The *Gyroceratite* of the latter is certainly only referrible to this fossil. Bronn gives as a synonym a *Lituites gracilis*, Goldf. Collect.; certainly there is in the Museum at Bonn a fossil designated as *Lituites*, but it is another fossil: it presents no chambers, and I think is a cast of *Euomphalus*, perhaps *Eu. lævis*, Goldf.

With regard to the increase in height and in breadth, the *A. compressus* is very near the *A. Dannenbergi*; it is principally distinguished from this by the simple lobes, and it never attains the size of the latter. There are neither ventral nor lateral lobes in this species; this Ammonite has in common with *A. lateseptatus* the simplicity of lobes. In the specimen figured Pl. I. fig. 6. there is a portion of the part without chambers preserved. It may be very distinctly seen, by the striæ upon the shell, that it was very thin.

The species described here, to which *A. expansus*, von Buch is nearly allied, form a group among the *Goniatites*, limited in a very natural manner. Except the dorsal lobe, which can always be very distinctly seen, there is nothing very particular to be said about the lobes. There is only a very slight inflexion of the transverse plates, that in every individual occupies the entire side quite to the suture. We cannot arrange here with certainty any of the *Goniatites* of the old transition limestone of the Fichtelgebirge described by Count Münster; *A. latus* and *A. angustiseptatus* can only be added to this section as doubtful species.

Section II. Simplices.

The dorsal lobe simple, infundibuliform or linguiform. There is a lateral lobe more or less angulose, and a broad lateral saddle occupying the greatest part of the side.

5. *Ammonites retrorsus*, Von Buch. Pl. I. fig. 10. *a*, *b*, *c*.
L. de Buch Goniat. p. 49. Pl. II. fig. 13.

The dorsal lobe small, infundibuliform, almost as broad as deep. The lateral lobe is rounded beneath, more than twice as deep as the dorsal lobe, and a little broader than deep. The lateral saddle, broad and rounded, is also raised to the dorsal

saddle, occupies half the side, and is gently hollowed in approaching the suture. The increase in height is 0·45, the increase in breadth 0·65; this Ammonite is altogether enveloped without an umbilicus. It is found with the *Goniatites* of the limestone of Oberscheld near Dillenburg, and in the Martenberg mine in the territory of Waldeck. The specimens that I possess of the first locality are at the most one inch, and otherwise altogether resemble those of Waldeck. This Ammonite has nothing but the enveloped form in common with *A. Munsteri*, which M. von Buch believed to be allied to *A. retrorsus*; on the contrary, it agrees so closely in the form and lobes with *A. simplex*, von Buch, that perhaps they ought not to be separated as distinct species. For the increase in height M. von Buch gives for *A. retrorsus* only 0·32, and for *A. simplex* 0·4; in all cases the height in both increases more rapidly than the breadth, so much so that the thickness in the outer whorls diminishes very fast, and the larger the Ammonite is the more discoid is its form. In *A. simplex*, as M. Buch has described and figured it, the dorsal lobe is considerably larger and the lateral lobe smaller, and of the same depth as the dorsal lobe. That is the only distinction between this Ammonite and *A. retrorsus*. The name of *retrorsus* is given from the very delicate striæ seen on the shell. On the lateral surface the terminations of the folds form a very smooth curve, inflected behind: they ascend again afterwards towards the back, and form above a narrow and deep sinus, the concavity of which is directed towards the front. The breadth and depth of the dorsal sinus appear to correspond to the breadth of the back in the different species. The smaller the back the deeper and more contracted is the sinus: in *A. lateseptatus* and *A. Listeri* it is very large and flat.

The *A. retrorsus* is the only species in this section that up to the present time has been found in the schistose rocks of the Rhine. *A. simplex*, which is nearly allied to it, and which is said to be found at Rammelsberg near Goslar, comes perhaps from the limestone of Grund, the fossils of which have a near affinity to those of the transition limestone of the Eifel. To these two Ammonites the *A. ovatus*, Münster, is intimately allied. The description gives us no important difference either

in the form or in the lobes. The principal part of this section is composed of numerous species of the transition limestone of the Fichtelgebirge, discovered by Count Münster, *A. nodulosus*, *A. sublævis*, *A. globosus*, *A. sublinearis*, *A. linearis*, *A. divisus* and *A. hybridus*. We may add as forming a third subdivision, *A. sulcatus* and *A. subsulcatus*, Münster, which distinguish themselves by their lateral linguiformed lobe, and are somewhat related to the following section: they have nevertheless the lateral saddle broad and rounded, which occupies the greater part of the side.

Section III. Æquales.

The dorsal lobe simple, linguiform or infundibuliform. There are two or more lateral lobes, that become successively greater or smaller in approaching the suture.

6. *Ammonites Becheri*, Goldf. Pl. I. fig. 7, 8.

L. de Buch Goniat. p. 39. Pl. II. fig. 2.

The dorsal lobe infundibuliform; on the side which is slightly vaulted are found four linguiform lateral lobes, which become smaller and smaller in approaching the suture. The first of these is twice as deep as the dorsal lobe; the fourth is but two-thirds the depth of the first, after it comes a considerable ventral saddle that is twice as broad as the third lateral saddle. The increase in height is 0·4, the increase in breadth 0·65. There are seven whorls; almost two-thirds of the inner ones are enveloped. This Ammonite occurs in the red limestone, amongst the *Goniatites* of Beilstein, near Oberscheld; it is also found in the hematitic iron of the mine of Rinzenberg. It appears to come very near *A. Henslowi*, Sow., but this has only three lateral linguiformed lobes. As it augments much more quickly in height than in breadth, its form is discoid, and the thickness rapidly diminishes. Its contour presents an elliptical appearance, as always happens when the height increases much faster than the breadth. The shell is rarely well preserved; it is thick and plaited: between the folds are found regular spaces, with numerous finer folds. The greatest thickness is near the suture; the side slightly vaulted falls gently towards the back; the latter forms

with the sides two ridges, entirely immersed, between which are found the folds of the dorsal sinus.

Besides *A. Becheri* and *A. Henslowi*, I place in this section *A. Münsteri*, von Buch, *A. orbicularis*, Münster, and also *A. planus*, Münst., which are all three found in the transition limestone of the Fichtelgebirge, and are characterized by the lateral lobes becoming larger and larger as they approach the suture. This distinction establishes in the section two very natural subdivisions.

[To be continued.]

III.—*Descriptions of some New or rare Indian Plants.* By G. A. W. Arnott, Esq., LL.D.

Schizostigma, Arn. (*Rubiaceæ*).

Calycis tubus globosus, limbus 5-partitus, laciniis lanceolatis. *Corolla* infundibuliformis, intus pubescens, extus hirsuta, ad medium usque 5-fida, laciniis lineari-lanceolatis patulis. *Antheræ* 5, lineares, obtusæ, ad faucem sessiles. *Ovarium* cohærens, multiloculare, loculis multiovulatis. *Stylus* filiformis, stamina longe superans. *Stigma* multi- (4—7) fidum, segmentis linearibus patulis. *Fructus* indehiscens, baccatus, globosus, costatus, hirsutus, laciniis calycinis foliaceis patentibus coronatus, pluri-(4—7) locularis, loculis polyspermis.

Herba decumbens vel subrepens, hirsuta. Caules *simplices*, 4—8 *poll. longi.* Folia, $1\frac{1}{2}$—2 *poll. longa, opposita, longiuscule petiolata, oblongo-lanceolata, integerrima, supra viridia, parcius pilosa, subtus pallida.* Stipulæ *interpetiolares, late ovatæ, acutæ, membranaceæ.* Flores, 8—9 *lin. longi, axillares, solitarii, alterni, subsessiles, basi bracteis duabus stipulis subsimilibus stipati.*

1. *S. hirsutum*, Arn.

Hab. in insula Ceylon.

This genus may be placed near *Sabicea.*

Acranthera, Arn. (*Rubiaceæ.*)

Calycis tubus oblongo-turbinatus, limbus 5-fidus, laciniis linearibus. *Corolla* tubulosa, intus glabra, extus hirsutissima, ultra medium 5-fida, laciniis erectis, spathulatis, retusis, æstivatione valvata plicata. *Stamina* 5, erecta, basi corollæ inserta, ea dimidio breviora ac ejus laciniis alterna: *filamenta* filiformia subpapillosa: *antheræ* innatæ, oblongo-lineares, connectivo apice in mucronem longiusculum ultra

loculos producto. *Ovarium* cohærens, pseudo-biloculare, dissepimentis duobus oppositis vix ad medium attingentibus, placentam bilamellatam divaricatam ferentibus : ovula innumera. *Stylus* filiformis, discum bulbiformem perforans : stigma clavatum, muriculatum. *Fructus* hirsutus, lineari-oblongus, compressiusculus, limbo calycis erecto coronatus, membranaceus, indehiscens, intus subpulposus, pseudo-bilocularis. *Semina* innumera, minuta, globosa, papillosa, placentæ lamellis nidulantia. *Albumen* corneum.

Herba *humilis* (3—8 *poll. alta*), *hirsuta, simplex, habitu quodammodo* Cyrtandraceo. Folia *opposita*, 4—6 *poll. longa, petiolata, oblongo-obovata, obtusa, basi attenuata, membranacea, integerrima, supra viridia, glabriosa, subtus pallida ; supremum par cæteris sæpius multo minus : pili rigidi, acutissimi, forsan urentes.* Stipulæ *interpetiolares, indivisæ, triangulares, ovatæ, acutæ.* Pedunculi *ex axillis supremis orti, breves, flores fastigiatos breviter pedicellatos ferentes.* Corolla *cærulea ac bacca matura pollicem longa, hæc duas lineas lata.*

1. A. *Ceylanica*, Arn. *Wight, Cat. n.* 2472.

Hab. in insula Ceylon, legerunt *Walker et Wight*, Martio 1836.

This approaches most to *Mussænda*, but differs by several characters and by the whole aspect. The internal structure of the fruit is not unlike that of some *Cyrtandraceæ*.

Neurocalyx, Hook. (*Rubiaceæ.*)

Calycis tubus breve turbinatus, 10-sulcatus, limbus 5-partitus, laciniis oblongis vel ovatis, acutis, patentibus, petaloides (albis), venosis, persistentibus, ovario multo majoribus ; æstivatio valvata, pyramidata. *Corolla* calyce brevior, rotata, stellatim 5-partita, tubo brevissimo, laciniis anguste lanceolatis. *Antheræ* magnæ, oblongæ, ad basin corollæ subsessiles, erectæ, marginibus in tubum subconicum coalitæ, connectivo dorso in ligulam brevem obtusam ultra loculos paullo producto. *Ovarium* adhærens, disco operculari puberulo coronatum, biloculare, placenta in quoque loculo ad dissepimentum medium peltata, carnosa, magna, multiovulata. *Stylus* filiformis, discum perforans. *Stigma* simpliciusculum vel obscure bilobum. *Fructus* subgloboso-turbinatus, 5-gonus, calycinis laciniis coronatus, membranaceus, indehiscens, bilocularis, polyspermus. Semina minuta.

Herbæ *simplices*. Caules *breves, versus apicem foliosi.* Folia *approximata attamen opposita, cuneato-lanceolata, longe petiolata, integerrima, penninervia, subtus pallidiora, nervis venisque ac petiolis ful-*

vis et plus minusve pubescentibus. Stipulæ *interpetiolares bifidæ.* Racemi *simplices, axillares, folio breviores, pedunculati, bracteati.* Flores *pedicellati : pedicellus basi unibracteolatus.*

1. *N. Wightii* (Arn.) ; stipularum segmentis ovatis, integris, apice subulato cuspidatis, bracteis vel integris vel basi utrinque laciniis setacea unica auctis. *Wight, Cat.* n. 2473.

Hab. ad Courtallum, *Wight.*

Caulis 3—12 poll. altus, inferne nudus, ferrugineo-pubescens. Racemi cernui, folio 2—3-plo breviores : pedicellus calyce duplo brevior. Calycis laciniæ ovatæ, corolla paullo tantum longiores : ovarium 10-costatum, 10-sulcatum, at fructus 5-angulatus, faciebus planiusculis.

2. N. *ceylanicus* (Hook.) ; stipularum segmentis lanceolatis attenuatis latere exteriore pinnatisectis, bracteis pedunculi palmatisectis, laciniis sub 5 lateralibus tenuioribus.

Hab. in insula Ceylon, ad "Adam's Peak," *Walker.*

Caulis subnullus. Racemi folio tantum paullo breviores : pedicellus calycem subæquans. Calycis laciniæ oblongæ, corollam duplo superantes : ovarium et fructus omnino ut in antecedente.

That this genus is allied to *Argostemma**, Wall., will not I presume be disputed ; indeed, trusting to the generic character alone which is given of that genus, it might be doubted if the two were truly distinct. In *Argostemma*, however, the calyx segments are green, and considerably shorter than the

* The following is a new species of *Argostemma*, the only one yet discovered in the Peninsula of India, found at Courtallum, in 1835, by Dr. Wight.

A. *courtallense* (Arn.) ; caule basi repente, supra terram erecto, simplici pubescente, foliis utrinque glabris, verticillatis terminalibus vel quaternis, duobus oppositis aut tribus late ovatis subæqualibus cætera oblonga multo superantibus, nunc quinto inferiore, vel rarius ternis subæqualibus, stipulis obsoletis, umbella pedunculata 2—6-flora foliis majoribus breviore, pedicellis calycibusque pubescentibus, floribus 4-meris, filamentis declinatis, antheris discretis, versus apicem rima duplici dehiscentibus. *Wight, Cat. n.* 2474.

Corolla alba, basi annulo viridi 4-fido lobis emarginatis notata, calycis segmenta ovata acuta duplo superans: laciniæ ovatæ, acutæ. Ab hoc differt affine *A. sarmentosum*, Wall., foliis haud verticillatis at tantum approximatis, cujusque pari valde inæqualibus, subtus ad nervos villosis, corolla calycem 5-plo superante ac laciniis lanceolatis : convenit autem stipularum defectu, floribus tetrameris, calyce pubescente, corolla basi viridi annulata, staminibus declinatis, antheris liberis.

DeCandolle, in his generic character, describes the anthers as cohering at the apex, which does not seem to be the case in any of the species noticed by Dr. Wallich, who constituted the genus.

corolla; here they are white and veined, and during æstivation quite inclose the corolla: in *Argostemma* the peduncles are either single-flowered, or bear an umbel or corymb; here the flowers form a loose simple raceme. In none of the specimens which I have examined, (and in some the seeds appeared perfectly ripe) did the fruit present the least appearance of dehiscence; as, however, the structure of the ovarium and disk is very similar to that of *Argostemma*, it is not improbable that, as described in that genus, the fruit may open in a radiating manner at the apex, which renders it doubtful whether it ought to be considered capsular, as DeCandolle, or baccata, as Dr. Wallich views it.

Since the above characters were drawn up, Sir W. J. Hooker has described this genus and figured one of the species in his valuable 'Icones Plantarum': he, however, has mentioned, but with doubt, the fruit as a 5-celled capsule, and in the plate traces of five dissepiments are represented. As this is the principal point of difference between his observations and mine, I have re-examined both flower and fruit of *N. Wightii*, and an ovarium of *N. ceylanicus*, but I cannot perceive more than the two cells which I have noticed.

In the same part of the 'Icones' two Ceylonese species of *Elæocarpus* are figured; of these *E. pubescens* (tab. 155.) is an excellent representation of my *E. subvillosus*, and *E. coriaceus* (tab. 154.) of my *E. obovatus*, published in the 'Nov. Act. Acad. C. L. Nat. Cur.' xviii. p. 322. Allied to *Elæocarpus* I possess a new genus, also from Ceylon, of which the petals are exactly as in *Elæocarpus*, the filaments long as in *Grewia*, or rather *Tilia*, the anthers short and considerably different from those of either; the leaves, with nearly the structure of some species of *Capparis*, are opposite and quite entire; the calyx has a valvular æstivation, and when in bud is globose and inclosed within two rounded concave bracteolæ; it may be *Elæocarpus integrifolius* of Moon's 'Catalogue of Ceylon Plants.' I have seen neither fruit nor seed.

[To be continued.]

IV.—*An attempt to ascertain the Fauna of Shropshire and North Wales.* By T. C. Eyton, Esq., F.L.S.

[Continued from vol. ii. p. 56.]

IV. *Reptilia.*

Lacerta agilis, Linn. (Sand Lizard.) Two British specimens of this beautiful species are in my collection, one captured by myself in the garden of the Inn at Capel Cerrig, the other on the borders of the Weald Moors.

Zootoca vivipara, Wagl. (Viviparous Lizard.) Common.

Anguis fragilis, Linn. (Blind Worm.) Common in many localities in North Wales, particularly on the hills in the neighbourhood of Barmouth.

Natrix torquata, Ray. (Common Snake.) Common.

Vipera communis, Leach. (Viper.) Found in many localities, though not very common, amongst which may be named Rudge Heath and Knocker Heath in Shropshire, and on the sea-shore in the neighbourhood of Barmouth.

Rana temporaria, Linn. (Frog.) Common.

Rana esculenta, Linn. (Edible Frog.) Found on the Weald Moors in Shropshire. During the war, some French emigrants who were at Wellington were highly delighted in finding the true sort in this locality.

Bufo vulgaris, Flem. (Toad.) Common.

Triton palustris, Flem. (Warty Eft.) Common in pits in the neighbourhood of Eyton. Is this species distinct from the following?

Triton punctatus, Bonap. (Common Eft.) Common both in Wales and Shropshire. A variety is found on the Holyhead mountain in spring, under stones, which differs in being of a much lighter colour, and in having two dark stripes on each side of the dorsal line; the belly is deep orange with much fewer spots than usual; the total length three inches: the numbering of the vertebræ however is the same as in the common species.

V. *Pisces.*

Perca fluviatilis, Linn. (Perch.) A common fish both in the rivers and pools throughout Shropshire, but I know of no lake in North Wales in which it is indigenous; the deformed variety found in the Thames I have repeatedly taken in the Shrewsbury canal. This deformity is by no means peculiar to perch; I have in my collection the back bone of a tench and also that of a roach exhibiting it. It is I suspect produced by the ungenial nature of the water produ-

cing weakness while young, as I never found one in this state of larger size.

Labrax Lupus, Cuv. et Val. (Basse.) Common at Barmouth, North Wales, where it is caught in the mouth of the river by trailing a piece of herring or other fish fixed on a hook after a sailing boat in a brisk wind.

Serranus Cabrilla, Cuv. et Val. (The smooth Serranus.) I have seen several specimens of this fish taken by lines in a small rocky bay between Rhoscolyn and Holyhead; it is of a beautiful glossy colour when taken out of the water.

Crenilabrus rupestris, Selby. (Jago's Gold Sinny.) A single specimen of this rare British fish is in my possession, obtained on the coast of North Wales, near Aberystwith, two years ago, having been thrown upon the sand by a storm; it agrees precisely with Mr. Selby's description in the 'Magazine of Zoology and Botany,' vol. i.

Acerina vulgaris, Cuv. et Val. (Ruffe.) Common in the rivers and canals of Shropshire; but I have never seen any Welsh specimens.

Trachinus Draco, Linn. (Great Weaver.) Occasionally found on the Welsh coast.

Trachinus Vipera, Cuv. et Val. (Lesser Weaver.) Common on the sandy portions of the coast, and the horror of all bare-footed shrimp-catchers.

Mullus Surmuletus, Linn. (Striped Red Mullet.) I once saw an enormous shoal of this species in the harbour at Holyhead; numbers were taken in nets.

Trigla Gurnardus, Linn. (Grey Gurnard.) Common.

Cottus Gobio, Linn. (Bullhead.) Common in the brooks and rivers of Shropshire, but never, that I am aware, observed in North Wales.

Cottus Bubalis, Euph. (Father-lasher.) Common.

Gasterosteus leiurus, Cuv. et Val. (Smooth-tailed Stickle-back.) The only species of this genus I have obtained in this neighbourhood, and I have no doubt of it being distinct: at first, however, I suspected this was not the case, having observed a single rudimentary scale posterior to the true ones; but although I have confined them by hundreds in small pools and jars with different kinds of water, no change has been produced further than increase of size.

Pagellus centrodontus. (Sea Bream.) Common near Holyhead.

Scomber Scomber, Linn. (Mackerel.) Common.

Zeus Faber, Linn. (Dory.) I have never obtained but one specimen on the Welsh coast, and it is certainly not by any means com-

mon, as all the fishermen at Holyhead where it was taken agreed in never having seen a fish of the sort there before.

Mugil Capito, Cuv. (Grey Mullet.) Occasionally met with.

Blennius Montagui, Flem. (Montagu? Blenny.) Once captured in the creek dividing Holyhead Island from Anglesea.

Blennius Gattorugine, Don. (Gattoruginous Blenny.) I never took but one specimen of this fish in Wales, it was at Holyhead. Although its form leaves no doubt as to the identity of the species, some slight differences from the descriptions of colour exist. In my specimen there are five black or dusky bands transversely across the body and back fin; the first arises at the anterior origin of the fin, and is continued to the gill covers: the base of the pectoral fins is also dusky.

Blennius Pholis, Linn. (Shanny.) In recent specimens of this fish there is an appendage composed of a few branching hairs arising on each side at the upper extremity of the cavity anterior to the eyes: in dried specimens these appendages are not seen.

Murænoïdes guttata, Lacep. (Spotted Gunnel.) Holyhead: not common.

Zoarces viviparus, Cuv. (Viviparous Blenny.) Holyhead and Barmouth: common.

Gobius niger, Linn. (Black Goby.) My specimens were obtained from Holyhead, under sea-weed in puddles, below high water mark; the black band in all is more distinct than represented in Mr. Yarrell's cut, and the scales are not so distinct.

Gobius bipunctatus, Yarr. (Double-spotted Goby.) Obtained at Holyhead, but not commonly.

Lophius piscatorius, Linn. (Angler.) Occasionally taken in herring nets off Holyhead. I have a specimen 3 feet 6 in. long, from which was taken nine herrings, and a leopard shark 18 inches long.

Cyprinus Carpio, Linn. (Carp.) Common.

Cyprinus Gibelio, Bloch. (Carucian Carp.) Found in a pit near Cotwall, Shropshire, into which it was introduced from Warwickshire.

Gobio fluviatilis, Will. (Gudgeon.) Common throughout Salop, but, as far as I have been able to ascertain, not indigenous in North Wales.

Tinca vulgaris, Cuv. (Tench.) Common.

Abramis Brama, Cuv. (Bream.) Found in Fennymere and other lakes in Salop.

Leuciscus Rutilus, Cuv. (Roach.) Common.

Leuciscus vulgaris, Cuv. (Dace.) Common in rivers: neither this nor the preceding species is found indigenous in North Wales.

Leuciscus Cephalus, Flem. (Chub.) Common in the rivers of Shropshire, but not that I am aware of ever found in North Wales.

Leuciscus Erythrophthalmus, Cuv. (Red-eye Chub.) Found, but not so commonly as the roach and dace, in Salop.

Leuciscus Alburnus, Cuv. (Bleak.) Not uncommon in the Severn near Shrewsbury. My specimens were obtained in the spring from small brooks running into that river, in company with minnows and small gudgeons.

Leuciscus Phoxinus, Cuv. (Minnow.) Common: I have a specimen from the North Forest wanting the nasal projection.

Cobitis barbatula, Linn. (Loach.) Common in Shropshire, but not observed in North Wales.

Esox Lucius, Linn. (Pike.) In Shropshire common, but not indigenous in North Wales.

Salmo Salar, Linn. (Salmon.) Ascends most of the rivers of North Wales and the Severn to spawn.

Salmo Trutta, Linn. (Salmon Trout and Sewen.) Found in the Islwyth and Conway.

Salmo Salmulus, Will. (Samlet.) Found in the Severn and in most of the rivers of North Wales.

Salmo Fario, Linn. (Common Trout.) Common: several varieties are found in the Welsh lakes, which at first sight might be taken for species; but upon a minute examination and dissection, I am convinced to the contrary; three different varieties are found in Dyner alone.

Salmo Salvelinus, Don. (Welsh Char.) Found in the following lakes of Wales, Corsygeddol, Llanberris, Llyn Quellyn near Snowdon, and Edna, a lake on the hills between Capel Cerrig and Bedgellert.

Osmerus Eperlanus, Flem. (Smelt.) Found in the Conway and Dee.

Thymallus vulgaris, Will. (Grayling.) Found in Severn, Team, and Clan in Shropshire. I am not aware of its occurrence in North Wales.

Salmo Lavaretus, Penn. (Groymad.) Found in abundance in Rala Pool.

Scopelus Humboldti, Cuv. (Argentine.) Pennant mentions a specimen taken near Downing.

Clupea Harengus, Linn. (Herring.) Taken in abundance on the Welsh coast.

Clupea alba, Yarrell. (White Bait.) The only locality I know of for this fish in the district, is in the Murdoch, a river running into the sea at Barmouth.

Alosa communis, Cuv. (Allis Shad.) In the Severn during summer.

Engraulis Encrasicholus, Flem. (Anchovy.) Pennant mentions having obtained this fish near Downing.

Morrhua vulgaris, Linn. (Cod.) Caught on many parts of the coast of North Wales.

Morrhua Æglefinus, Cuv. (Haddock.) Caught occasionally on most parts of the coast.

Merlangus Pollachius, Cuv. (Pollach.) Common.

Platessa vulgaris, Flem. (Plaice.) Common.

Platessa Flesus, Cuv. (Flounder.) Common in the Severn.

Platessa Limanda, Cuv. (Dab.) Holyhead: common.

Rhombus maximus, Cuv. (Turbot.) Holyhead and on the Caernarvonshire coast.

Rhombus vulgaris. (Brill.) Common.

Rhombus megastoma, Cuv. (Whiff.) Once captured at Holyhead.

Solea vulgaris, Mer. (Sole.) Common.

Cyclopterus lumpus, Linn. (Lump-sucker.) Occasionally taken at Holyhead. I have specimens in my collection not more than three quarters of an inch long.

Liparis vulgaris, Cuv. (Unctuous Sucker.) Common.

Liparis Montagui, Cuv. (Montagu's Sucker.) Holyhead: not common.

Anguilla acutirostris, Yarr. (Sharp-nosed Eel.) Found in the Severn, and in pools near Eyton.

Anguilla latirostris, Yarr. (Broad-nosed Eel.) Frequents the muddy drains on the Weald Moors rather than running water, and grows to a much larger size than the preceding.

Anguilla mediorostris, Yarr. (Snig.) Also found occasionally in the neighbourhood of Eyton.

Conger vulgaris, Cuv. (Conger.) Common in the neighbourhood of Holyhead.

Leptocephalus Morrisii, Penn. (Anglesea Morris.) Three or four specimens have at different times been taken on the Welsh coast.

Ammodytes Tobianus, Cuv. (Sand Eel.) Common.

Ammodytes Lancea, Cuv. (Sand Launce.) Also found occasionally on the Welsh coast in company with the preceding, but not nearly so commonly.

Syngnathus Typhle, Linn. (Deep-nosed Pipe-fish.) Once taken at Holyhead.

Syngnathus Ophidion, Bloch. (Snake Pipe-fish.) Several times captured near Holyhead.

Syngnathus lumbriciformis, Jenyns. (Worm Pipe-fish.) Holyhead: common.

Acipenser Sturio, Linn. (Sturgeon.) One of these fish was taken in 1799 in the Severn above Shrewsbury. The specimen is now in the Museum of the Shropshire and North Wales Natural History Society.

Scyllium Canicula, Cuv. (Spotted Dog-fish.) Common on the Welsh coast.

Lamna Monensis, Cuv. (Beaumaris Shark.) Has been twice taken in the Menai Straits.

Selache maximus, Cuv. (Basking Shark.) Occurs but rarely on the Welsh coast.

Raia Batis, Linn. (Skate.) On the Welsh coast, but not common.

Raia clavata, Will. (Thornback.) Common.

Petromyzon marinus, Linn. (Lamprey.) Found in the Severn and Dee.

Petromyzon fluviatilis, Linn. (Lampern.) Also found in the Severn and Dee; in the former, though in great abundance, near Worcester: it is rare at Shrewsbury.

Ammocœtes branchialis, Cuv. (Land Pride.) Common in the brooks of Salop.

V.—*Floræ Insularum Novæ Zelandiæ Precursor; or a Specimen of the Botany of the Islands of New Zealand.* By Allan Cunningham, Esq.

[Continued from vol. ii. p. 214.]

HALORAGEÆ, *R. Br.*

1. Cercodia, *Murray, Lamarck.*

Calycis tubus ovario adnatus, limbus 4-partitus. *Petala* 4. *Stam.* 8. *Stigmata* 4, sessilia. *Fructus* nucamentaceus, indehiscens, tetraqueter, 4-alatus, 4-locularis, 4-spermus.

526. *C. erecta*, foliis (oppositis) petiolatis ovato-lanceolatis grosse dentatis, 2—3 uncialibus; floribus in axillis superioribus sessilibus aggregato-verticillatis. *DC. Prodr.* iii. *p.* 67. *A. Rich. Fl. Nov. Zel. p.* 324.—Haloragis alata. *Jacq. Ic.* 1. *t.* 69.

Ti or *Toa-Toa*, incol. *D'Urville.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Open fern-grounds, Bay of Islands.—1826, *A. Cunningham.*

527. *C. alternifolia*, foliis alternis petiolatis ovato-lanceolatis acutis grosse serratis scabriusculis (uncialibus), floribus axillaribus pedicellatis solitariis vel in verticillis 2—3, versus extremitates ramulorum, ramulis angulatis asperis.

New Zealand (Northern Island). Among fern, on the shores of the Bay of Islands.—1833, *R. Cunningham.*

528. *C. incana*, cano-villosa, foliis oppositis brevi-petiolatis oblongo-ovatis ovatisve coriaceis serratis, floribus axillaribus solitariis vel terminalibus racemosis.

New Zealand (Northern Island). Dry exposed rocky hills. Wangaroa.—1826, *A. Cunningham.*

GONIOCARPUS, *Kœnig.*

Calycis tubus ovario ovato adhærens, limbus 4-partitus. *Petala* 4, lobis calycis alterna. *Stamina* 8. *Stigmata* 4. *Fructus* nucamentaceus indehiscens, 8-angulatus, 8-nervius, 4-locularis, 4-spermus. *Semina* in loculis pendula.

529. *G. tetragynus*, foliis ovatis serratis acutis subscabris, junioribus petalis ramulisque pilosis, spicis elongatis, floribus sessilibus erectis. *DC. Prodr.* iii. p. 66.—G. tetragyna. *Labill. Nov. Holl.* i. p. 39. t. 53.

New Zealand (Northern Island). Among fern, on hills around the Bay of Islands.—1833, *R. Cunningham.*

Obs. Caulis spithamæus et triplo altior, suberectus obtuse tetragonus ut ramula. *Flores* ex axillis foliorum seu bractearum alternarum, solitarii. *Petala* 4, pilis caducis exasperata. *Staminum filamenta* octo brevia, antheræ oblongæ tetragonæ biloculares. *Germen* inferum subglobosum. *Stigmata* penicilliformia.

530. *G. citriodorus*; repens, foliis ovato-rotundatis cordatis acutis crenulatis, petalis ramulisque glabris, spicis abbreviatis, floribus tetrandris pendulis.

Piri-piri ab incolis vulgo nominatur.

New Zealand (Northern Island). In bogs, on the banks of the Keri Keri river, Bay of Islands.—1834, *Rich. Cunningham.*

531. *G. depressus*, repens, foliis elliptico-ovatis acutis crenatis, ramulisque scabriusculis, spicis elongatis laxis, floribus subsessilibus patulis.

New Zealand (Northern Island). Low boggy ground at Wangaroa.—1826, *A. Cunningham.*

MYRIOPHYLLUM, *Vaill., Linn.*

532. *M. propinquum*, foliis quaternum verticillatis pinnatipartitis, lobis linearibus oppositis, inferioribus quandoque linearibus integris vel dentatis, floribus axillaribus solitariis geminisve.

New Zealand (Northern Island). Bogs at the Mission Station on the Keri Keri river, as also on the Hokianga river.—1834, *R. Cunningham.*

Obs. Herba facie *Myriophylli verticillati*, L. Omnino cum *M. elatinoidi*, Gaud. (*Ann. Sc. Nat.* v. *p.* 105) characteribus congruit nostra planta; floribus axillaribus dioicis, masculis octandris, sed fortasse diversa.

ONAGRARIÆ, *Juss.*

1. FUCHSIA, *Plum., L.*

* *Flores petaliferi.*

533. *F. excorticata*, ramis lævibus demum excorticatis, foliis alternis petiolatis ovato-lanceolatis acuminatis denticulatis subtus dealbatis glabris, pe-

dicellis axillaribus flore subbrevioribus, lobis calycis lanceolatis tubo longioribus trinerviis, petala ovata duplo superantibus. *DC. Prodr.* iii. *p.* 39. *Bot. Reg. t.* 857.—Skinnera excorticata. *Forst. Gen. t.* 29. *A. Rich. Fl. Nov. Zel. p.* 331.

Kohutu-hutu vulgo ab incolis dicitur.

The berries of this fine plant, which emit a delicious perfume, and are produced in great abundance during the summer months in New Zealand, contain a large portion of sugar, and on that account are eaten with avidity, both by the natives and the birds of those islands. How Forster could have so misunderstood the fruit of this shrub as to have described it as a capsule, and in consequence erected it into a genus distinct from *Fuchsia*, to which all subsequent botanists (saving M. Ach. Richard, who retains Forster's genus) have referred it, is difficult to understand.

** *Flores apetali.*

534. *F. procumbens* (R. C. Mss.), caule procumbente adscendente, ramis gracilibus glabris, foliis sparsis alternis longe petiolatis lato-ellipticis subrotundisve obtusis basi subinde cordatis remote denticulatis ciliatis, paginis glabris, pedicellis solitariis axillaribus (in ramulis lateralibus) flore ter brevioribus, perianthio infundibuliformi, lobis lanceolatis reflexis tubo brevioribus, stylo elongato filiformi stamina exserta superante, stigmate dilatato lobato, pilis patentibus tenuiter instructo!

Totera indigenis.

New Zealand (Northern Island). Around the village of Matauri on the east coast opposite the Cavallos Isles, inhabiting the sands immediately above the range of the tide, where it was found in flower in March.—1834, *R. Cunningham.*

Fruticulus decumbens, virgatus. *Rami* patentes, graciles, glabri, teretes, juniores foliati. *Folia* subuncialia venosa, basi cordiformia, minute denticulata, utrinque glabra. *Petioli* unciales, complanato-filiformes, glabriusculi supra canaliculati. *Flores* axillares, solitarii, erecti. *Perianthium* tubulosum, aurantio-luteum, limbus 4-partitus reflexus, laciniis æqualibus lanceolatis acutis viridibus, apicibus purpureo-luridis. *Stamina* octo, filamenta fauci inserta. *Antheræ* ovatæ, biloculares, peltatæ. *Ovarium* 4-loculare, loculis pluriovulatis, ovulis obovatis erectis. *Stylus* complanatus, staminibus longior. *Stigma* clavatum, lobatum. Bacca—?

2. Epilobium, *L.*

535. *E. nummularifolium* (R. C. Mss.) foliis oppositis (lineam unam longis) subrotundis carnosis petiolatis integris subcrenulatisve glabris subtus glaucis, floribus pedicellatis axillaribus solitariis, fructibus pedunculatis albopubentibus, caule repente.—E. pendulum. *Sol. Mss. in Bibl. Banks.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Shores of the Keri Keri river, and in dry as well as in boggy grounds.—1834, *Rich. Cunningham.*

536. *E. pedunculare*, repens, radicans, parum pubescens, foliis oppositis

subrotundis (2 lineas longis) membranaceis petiolatis denticulatis, floribus axillaribus solitariis, pedunculis elongatis, fructibus glabris.

New Zealand (Northern Island). Near the lake situated between Waimaté Mission House and the great forest of Hokianga.—1834, *Rich. Cunningham.*

537. *E. microphyllum*, caulibus erectis gracilibus lævibus, foliis inferioribus oppositis (vix unam lineam longis) ovalibus obtusis carnosis brevi-petiolatis integerrimis utrinque glabris aveniis, floribus solitariis axillaribus pedicellatis, fructibus brevi-pedunculatis, marginibus tantum albo-pubentibus. *A. Rich. Fl. Nov. Zel. p.* 325. *t.* 36. *f.* 2.

Popa vulgo incolæ nuncupant. *D'Urville.*

New Zealand (Middle Island). Dry and sandy places near Astrolabe Harbour.—1827, *D'Urville.*

538. *E. rotundifolium*, caule erectiusculo cinereo-pubescente, foliis oppositis (semiuncialibus) petiolatis subrotundis lato-ellipticisve obtusis denticulatis glabriusculis, petiolis ramulisque cinereis, floribus solitariis axillaribus pedunculatis, pedunculis incanis folio longioribus, fructibus tenuissime pubentibus. *Forst. Prodr. n.* 161. *DC. Prodr.* iii. *p.* 43. *A. Rich. Fl. Nov. Zel. p.* 326.—E. flaccidum. *Sol. Ms. non Brot.*

New Zealand (Northern Island)—1769, *Sir Jos. Banks.* Alluvial shores of the Kana-Kana river.—1826, *A. Cunningham.* (Middle Island). Queen Charlotte's Sound.—1773, *G. Forster.*

539. *E. thymifolium* (RC. Ms.); caulibus ascendentibus cinereo-scabriusculis, foliis oppositis (2 lin. longis) ovato-oblongis obtusis crassiusculis undulatis integerrimis vel paucidenticulatis scabris, floribus solitariis geminisve axillaribus, pedunculis capsulisque albo-pubentibus.

New Zealand (Northern Island). Among fern in dry exposed situations at the Waimaté Mission Station.—1833, *R. Cunningham.*

540. *E. alsinoides*, caulibus adscendentibus divaricatis glabriusculis, foliis oppositis alternisve ovatis obtusis membranaceis integerrimis seu paucidenticulatis glabris, floribus solitariis axillaribus pedicellatis, pedunculis elongatis capsulisque tenuiter incano-pubescentibus.

New Zealand (Northern Island). Between the Waimaté and Keri-Keri Mission Stations, Bay of Islands.—1833, *R. Cunningham.*

541. *E. nerterioides*, glabrum, caule repente radicante, foliis oppositis ellipticis (2 lin. longis) obtusis petiolatis subintegerrimis margine revolutis, utrinque capsulisque lævibus, floribus solitariis axillaribus pedicellatis.

New Zealand (Northern Island). Bogs, near the Kana-Kana river, Bay of Islands.—1826, *A. Cunningham.*

542. *E. atriplicifolium*, glabriusculum, caule basi suffruticoso erecto, foliis oppositis (sup. alternis) ovato-lanceolatis rhomboideisve crassiusculis remote dentatis, floribus solitariis axillaribus breve pedicellatis, pedunculis fructiferis capsula lævi subquater brevioribus, ramulis tenuissime cano-pubentibus.

New Zealand (Northern Island). Damp woods, near the great falls of the Keri Keri river, Bay of Islands.—1833, *R. Cunningham.*

543. *E. pubens*, pubigerum, caule erecto, foliis inferioribus oppositis ovalibus ovali-oblongisve venosis obtusis petiolatis serratis, floribus axillaribus

solitariis, pedunculis fructiferis capsula ter brevioribus. *A. Rich. Fl. Nov Zel. p.* 329. *t.* 36. *f.* 1.

Kata-pourogui nomen vernaculum. *D'Urville.*

Caulis repens, ramis erectis vix pedalibus. *Flores* parvuli, albi, breviter pedunculati.

544. *E. cinereum*, pubenti-cinereum, foliis suboppositis lineari-lanceolatis subspathulatis apice mucronulatis margine parum et distanter dentatis, floribus axillaribus solitariis, pedunculis fructiferis capsula multoties brevioribus. *A. Rich. Fl. Nov. Zel. p.* 320.

Pou-nao-ucko, indigenis. *D'Urville.*

New Zealand (Northern Island). Shady situations on the skirts of woods, Wangaroa, &c.—1833, *R. Cunningham.* Bay of Islands.—1827, *D'Urville.*

Caulis erectus, 2-pedalis. *Flores rubelli.*

545. *E. incanum*, erectum cano-villosum, foliis lineari-oblongis apice apiculo obtuso, margine pauci- remoteque dentatis, floribus axillaribus solitariis, pedunculis capsuliferis, fructu parum brevioribus.

New Zealand (Northern Island). Margins of woods, near the falls of the Waitangy river, Bay of Islands.—1834, *R. Cunningham.*

Obs. Species præcedenti valde affinis, sed forsan characteribus datis distincta, omnino villosior.

546. *E. hirtigerum*, strictum, dense laxeque pilosum, foliis (uncialibus) alternis sessilibus confertis angusto-lanceolatis acutiusculis supra convexis integerrimis aut raro denticulatis modice erectis subappresisve, floribus axillaribus solitariis brevissime pedicellatis, capsula pedunculo fructifero multoties longiore.

New Zealand (Northern Island). Skirts of forests round Wangaroa Harbour.—1833, *R. Cunningham.*

Caulis erectus, bipedalis, confertim foliosus. *Flores* purpurei seu lilacini. *Capsula* (2-pollicaris) obtuse tetragona, villosa, villis lanuginosis.

547. *E. virgatum*, erectum, gracile foliis (inferioribus) oppositis linearibus (subuncialibus) acutis paucidentatis modice erectis, ramulisque tenuiter virgatis incanis, floribus axillaribus solitariis, pedunculis fructiferis capsulam subæquantibus.

New Zealand (Northern Island). In woods near the falls of the Keri-Keri river, at the head of the Kana-Kana river, &c., Bay of Islands.—1834, *R. Cunningham.*

548. *E. glabellum*, ramis erectis glabriusculis, foliis (inferioribus) oppositis oblongo-lanceolatis lanceolatisve obtusiusculis brevi-petiolatis distanter serratis, nervis margineque ciliatis, floribus axillaribus solitariis, capsula pedunculo fructifero plus triplo longiore. *Forst. Prodr. n.* 160. *A. Rich. Fl. Nov. Zel. p.* 328.

Mati couragui, indig. *D'Urville.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Country between the Waitangy and the Keri-Keri rivers, Bay of Islands.—1834, *R. Cunningham.* (Middle Island.)—1773, *G. Forster.*

Caulis prostratus repens, ramis erectis pedalibus et ultra. *Folia* pollicem

et ultra longa. *Flores* rubelli, pedunculati, pedunculo brevi tomentoso. *Capsula* 2-pollicaris, obsolete quadrigona, præsertim ad suturas pubescens.

549. *E. confertum*, strictum, adpresso curtoque canum, foliis (uncialibus) oblongo-lanceolatis argute serratis ad axillas confertis, floribus axillaribus solitariis, pedunculis fructiferis capsula duplo brevioribus.

New Zealand (Northern Island). Among grass on river banks, Wangaroa.—1826, *A. Cunningham.*

Caulis erectus, pedalis. *Rami* rubelli, pilis albis adpressis brevissimis conspersi. *Folia* lanceolata, angusta, remote serrata vel subsinuata, fasciculata. *Flores* secus apices ramorum axillares. *Capsula* linearis bipollicaris, obtuse tetragona.

550. *E. pallidiflorum*, (Sol. Ms.) erectum, glabriusculum, foliis oppositis breviter petiolatis longo-lanceolatis acuminatis serrulatis venosis, floribus ad summitatem ramulorum axillaribus, ramulisque albo-patentibus, capsula pedunculo fructifero ter longiore.

New Zealand (Northern Island). Swampy grounds, Opuraga (Mercury Bay, lat. $36\frac{3}{4}°$. S.)—1769, *Sir Jos. Banks.* In low wet situations, Wangaroa. —1826, *A. Cunningham.*

Caulis erectus, tripedalis et ultra; ramis teretibus strictis virgatis fuscis tenuissime pubentibus. *Flores* albi, majores quam in alteris speciebus, laciniis calycinis ovatis acutis corolla brevioribus.

551. *E. junceum* (Sol. Ms.) caule tereti fistuloso, superne incano-pubescente, foliis sessilibus lanceolatis acutis denticulatis glabriusculis, calycibus acuminatis corollam superantibus. *Spreng. Syst. Veg.* ii. *p.* 233. *Forst. Prodr. n.* 516.—E. denticulatum, *Ruiz et Pavon. Fl. Peruv.* iii. *p.* 78. *t.* 314. *sec. Spreng.*

552. *E. haloragifolium*, caule erecto, foliis (semiuncialibus) superioribus alternis subsessilibus patentibus ovato-lanceolatis obtusis remote dentatis glabris, floribus ad summa ramulorum solitariis, pedunculis fructiferis capsula pubigera triplo quadruplove brevioribus, ramulis pubescentibus.

New Zealand (Northern Island). Shady places among fern on the Waicaddy river, Bay of Islands.—1833, *R. Cunningham.*

Obs. Valde affine *E. atriplicifolio*, sed differt foliis ovato-lanceolatis, et capsula matura pubente.

[To be continued.]

VI.—*On an apparently undescribed Species of* Lepadogaster; *and on the* Gobius minutus *of Muller, and* Cyclopterus minutus of *Pallas? considered as the young of* Cycl. lumpus, *Linn.* By Wm. Thompson, Esq., Vice-President of the Natural History Society of Belfast*.

Lepadogaster cephalus, *mihi.* Connemara Sucker.

In the collection of Robert Ball, Esq., of Dublin, there is an

* Read before this Society December 5, 1838, and illustrated by the specimens alluded to.

apparently undescribed species of *Lepadogaster* which was taken in Roundstone Bay, Connemara, on the western coast of Ireland. From the two British species already known, *L. bimaculatus* and *L. Cornubiensis*, this fish is very different. It cannot be that alluded to in his paper on the Fishes of Cornwall by Mr. Couch, (Linn. Trans. v. xiv. p. 88.) as allied to the latter, nor can it be mistaken by any ichthyologist for the *L. Cornubiensis*, which has been described so differently by authors as to have led Mr. Jenyns to remark in reference to it that "possibly we may have two species in our seas, which have been hitherto confounded." 'Man. Brit. Vert. An.' p. 470. A critical comparison shows that the fish under consideration agrees not with any of the eleven or twelve ? (see p. 274) species described by Risso as inhabiting the Mediterranean *, 'Hist. Nat. l'Eur. Mer.' t. 3. p. 271—of these, the *L. biciliatus* is considered by Mr. Yarrell to be the same as the *L. Cornubiensis*. Although in the depressed form of the head, this fish resembles more the minute species *L. bimaculatus* than the *L. Cornubiensis*, yet its equalling the latter in size, and having with it the dorsal and anal fins occupying a considerable portion of its length, renders it only necessary to be compared with this species. In general form it differs much from *L. Cornubiensis* † ; though narrower in the snout it is of greater breadth across the posterior part of the head; it is also much more depressed in the anterior half, and narrows suddenly behind the ventral disk, being to the tail compressed and tapering—in *L. Cornubiensis* the body slopes gradually from the head posteriorly.

* This genus is either limited in geographical distribution, or there is much yet to be learned respecting it. In the general work of Bloch there is not a single species included; in the 'Prodromus Ichthyologiæ Scandinavicæ' of Nilsson, published in 1832, there are none, and in the 'Fauna Boreali-Americana' it is remarked that none of the genus has yet been detected in America.

Since this article was sent forward for publication I have seen Mr. Lowe's 'Synopsis of the Fishes of Madeira,' just published in the 'Transactions of the Zoological Society of London' (vol. ii. part 3). Here I find a species of *Lepadogaster* described, but with much doubt, as the *L. Candollii* of Risso.—The few characters of the Madeira fish given by Mr. Lowe accord with those of *L. cephalus*; but without a more detailed description of it, any opinion as to the identity of the species must be premature.

† The comparison is drawn up between the *L. cephalus* and an individual of *L. Cornubiensis* of similar size.

Desc. Length, $2\frac{1}{2}$ inches; skin smooth; fin rays in number, D. 15; A. 10; P. 25 and 4; C. 15 (conspicuous, or 20 in all,) = Br. 5. Head very broad posteriorly, thence to the snout (which is truncated and $1\frac{1}{2}$ line across*) sub-conical, occupying rather more than $\frac{1}{3}$ of the entire length; from this part to a little beyond the portion of the body above the termination of the ventral disk likewise sub-conical; thence to the tail rather compressed and tapering: in advance of each eye and on a line with its upper margin an extremely minute cirrus, hardly visible without a lens: eyes large, lateral, the space between them twice their diameter, distant from snout $1\frac{1}{2}$ of their diameters, occupying $\frac{1}{5}$ the length of head: gape wide, the lower jaw rather the shorter; teeth pointed and very numerous in both jaws, the outer ones of the upper jaw the largest: gill opening small: pectoral fins placed just behind it, and "extending downwards to the lower surface of the body, where the rays [4 in number] become suddenly stronger, and the membrane doubling forwards passes on to unite with that of the opposite fin under the throat; the membranes of the pectorals thus united inclose a disk, and form a [slight] hemispherical cavity * * * * * [but smaller and of a different structure from that of *L. Cornubiensis*] formed by the united ventrals:" dorsal fin originating behind the middle of the entire length, and continued to near the caudal fin, with which it is unconnected; anal fin commencing nearer the caudal, from which it is separate; last ray of dorsal and anal fins when laid close to the body reaching to the base of the outer rays of caudal fin, their posterior rays about equal in length to the depth of the body at their base; caudal fin occupying about $\frac{1}{6}$ of the entire length, central rays longest; rays of all the fins articulated but not branched; vent situated midway between the posterior part of ventral disk and the extremity of caudal fin: a short anal tubercle as in the genus *Gobius*—this the *L. Cornubiensis* and *L. bimaculatus* also possess.

Colour (in spirits)—entire upper surface, sides of head and body, of an uniform dull flesh colour, (having been probably

* $2\frac{1}{4}$ lines in the specimen of *L. Cornubiensis*.

crimson when recent,) pectoral fins and under surface of a paler hue; dorsal, anal, and caudal fins pale carmine at the base, changing gradually to deep carmine at the extremities.

Spec. Char. A single very minute cirrus before each eye; dorsal and anal fins unconnected with the caudal; ventral disk small.

When noticing the *Lepadogaster Cornubiensis* as an Irish species before the Zoological Society of London in June 1835, (Proceedings Z. S., p. 81.) I called attention to the very great discrepancy in the number of fin-rays in the specimen then exhibited, compared with that attributed to the species by the British authors who had to that period described it; stating at the same time that I could not but consider the Irish specimen the *L. Cornubiensis*. The individuals who furnished the descriptions to the works of Mr. Jenyns and Mr. Yarrell since published have accorded with mine, and the view taken by these authors respecting the synonyma is similar.

Dr. Fleming in describing the *L. Cornubiensis* (Brit. Anim. p. 189.) remarks, that it "differs from the *L. Gouani* and *L. Balbis* of Risso;" and adds, "the former of these, figured by Gouan, Ich. p. 177. gen. xxxiv. t. 1. f. 6, 7, differs in the spots behind the eyes being crescent-shaped, and the dorsal fin having a greater number of rays." Here there is some confusion—what is stated in reference to the spots in Gouan's figure is correct, but not so the number of fin-rays, as in the figure of the upper side of the fish 11 rays—the number Dr. Fleming attributes to the *L. Cornubiensis*—are represented in the dorsal fin; in the engraving of the under side 10 rays only appear in this same fin; in the anal fin likewise one ray less is given in the view of the under side than in that of the upper (9): it thus seems as if the precise number of rays was not intended to be represented. Besides the form of the markings behind the eyes being different in Gouan's figure from those of the *L. Cornubiensis* as mentioned in the extract above quoted, the separation of the dorsal and anal from the caudal fin (supposing the engraving to be correct) at once shows his to be distinct from this species. Risso, referring to Gouan's figure as an illustration of the *Lepadogaster* that

he has named *L. Gouani*, gives 16 as the number of rays in the dorsal fin*.

Gobius minutus, Mull., *Cyclopterus minutus*, Pall.?† *and* *Cycl. lumpus*, Linn.

When dredging in Strangford Lough, county of Down, on the 2nd of July last, and whilst engaged in capturing specimens of *Couchia minor* (see Annals for February) on the surface of the sea, the dredge ‡ brought to light two individuals of the *Gobius minutus* of the 'Zoologia Danica.' In classification these belong to the genus *Cyclopterus* as now restricted, and in the 'Prodromus Ichthyologiæ Scandinavicæ' of Nilsson (p. 61.) are brought under this genus, the specific name of *minutus* being retained.

Desc. These specimens are each half an inch long—the greatest length attributed to the species in Zool. Dan. is 2 inches—and when viewed from above, like the young of *C. lumpus*, are much of a tadpole form, or about one half of the entire length somewhat globose, thence to the caudal fin much compressed: first dorsal fin lobiform as in that species, second dorsal originating just behind it, and extending to near the caudal fin: anal commencing at some little distance from the vent, and ending on the same plane with the second dorsal—the number of rays in the above fins could not be accurately estimated: pectorals about 16 rays, large, "uniting under the throat and inclosing the disk of the ventrals" as in *C. lumpus*; disk likewise similar (as it also is to that of *Liparis Montagui*) with five lines diverging from the central one; caudal fin square at the end, rays from 8 to 10: vent at about the middle of the entire length: no spines anywhere visible.

Colour (when recent)—one individual has the body of a very

* Hist. Nat. l'Eur. Merid. t. 3. p. 271. There is a typographical error here; Gouan, i. 67. being quoted instead of [t.] i. [fig.] 6 and 7.

† These have not been recorded with certainty as British, either as varieties or genuine species. I have not had authentic specimens of either fish to examine, but judge from descriptions and figures.

‡ They were taken in a sheltered bay in which the water was about 25 fathoms in depth; but although brought up in the dredge, they might have been captured anywhere between the bottom and the surface of the water—the warmth and calmness of the day was such that it might have attracted them hither.

pale dull yellow, and under the lens appears closely studded with extremely minute black points; besides these it exhibits at intervals all over the body conspicuous round spots of a reddish rust-colour; a blue line extends from each eye to the extremity of the mouth just beneath; first dorsal fin dusky or blackish, other fins pale-coloured; a blackish band across the tail, at the base of the caudal fin.

Of the second specimen the general hue is slightly reddish, and consequently the rust-coloured spots are less conspicuous; they are likewise fewer in number; tail dusky and not exhibiting the band like the first described; in other respects similar—no dull ferruginous striæ apparent on dorsal or caudal fins of either specimen are described in the 'Zool. Dan.'*

Having since the autumn of 1836 possessed very small specimens of a *Cyclopterus* a few lines longer than those just described, and which I was disposed to consider the *Cycl. minutus* of authors, I compared them with those of the *Gob. minutus*, when the difference seemed consequent on variety of colour and on age only. Those looked upon as *Cycl. minutus* again compared with undoubted specimens of *Cycl. lumpus* a very little larger, were evidently this species in a younger state. To understand this some detail is requisite.

First,—with reference to the identity of *Gob. minutus* and *Cycl. minutus*, Pallas†, it may be observed that the two specimens of the former have what may be termed three tubercles on the snout (a character attributed to *Cycl. minutus*, Pall., and apparent on the specimens believed to be of this species now before me‡) from the bone (?) advancing forward so as to form two points above the upper lip, and central between them but

* The specific characters here given are "Gobius albicans, ferrugineo-maculatus, radiis dorsalibus, et caudalibus ferrugineo obsolete striatis."

† I have not had the 'Spicilegia Zoologica' to consult, but judge from the description and sketches of the figures most kindly copied from the work for me by Mr. Yarrell. Cuvier, in the 'Règne Animal', t. 2. p. 346 (note), considers the *Gob. minutus*, Zool. Dan. and *Cycl. minutus*, Pall., as distinct. It is the latter, without any allusion to the *Gob. minutus*, that is enumerated among the fishes given in the Appendix to Ross's second Voyage. Since this note was so far written I have had the opportunity of meeting Capt. J. C. Ross, the author of that portion of the work, who informed me that he was of opinion that the *Gob. minutus*, Z. D., and *Cycl. minutus*, Pall., constituted two species—of the former he judged from the description, accordant with which specimens had not been obtained during his northern voyages.

‡ Some individuals are so plump as not to exhibit these points.

placed higher up is a third prominence. With the following exceptions they have all the characters of any value in common. The tubercles which appear on the side of the others are wanting in *Gob. minutus*, but a series of specimens of *C. lumpus* I have examined sufficiently prove that these are only acquired by individuals of a larger size; and their absence is consequently attributed in the present instance to the extreme youth of the individuals. The reddish spots of *Gob. minutus* would seem merely to indicate a *variety*; an opinion which is strengthened by the difference the two individuals present in this respect, one displaying very few and the other numerous spots, and further by these markings so conspicuous in the recent state (having been quite as much so in one of my specimens as represented in 'Zool. Dan.') becoming very obscure after the fish has been a short time preserved in spirits. Between these and equally small ordinary specimens of *C. lumpus* I perceive no difference but in the spotting. The *Gob. minutus*, which is not described as possessing spines or tubercles, is stated to attain 2 inches in length*, a size much larger than any specimens I have seen without tubercles; but as the *C. lumpus* differs much with respect to the time these originate, this circumstance does not, I conceive, affect the question of their identity.

Secondly.—With reference to specimens intermediate in size between the *Gob. minutus* and *C. lumpus* being the *Cycl. minutus*, it may be remarked, that the only character of this species given in Turton's edition of the 'Systema Naturæ,' that seems specifically different, is, "in the place of the first dorsal fin is a tapering reclined long spine†," (vol. i. p. 905): in my specimens, the fleshy appendage which takes the place of the first dorsal fin has to the eye a rigid appearance, but is in reality soft, and may from that circumstance have led to what has just been quoted being adopted as a character. With Pallas's description of *Cycl. minutus* my specimens generally accord: this author does not, like Turton, speak of a dorsal

* The figures given as of adult specimens in 'Zool. Dan.' very little exceed one inch.

† This may be adopted from Gmelin, whom I see quoted for the species, which was not described by Linnæus himself. Turton's description seems to refer to Pallas's fish.

spine, but of a spurious dorsal fin, an expression most applicable to those before me—this spurious fin is comparatively longer in small than in large individuals. One of my specimens, 10 lines in length, conspicuously presents three tubercles on the centre of body, where *Cycl. minutus* is stated to have two ("in mediis lateribus, supra pinnas pectorales proxime ad sinum branchialem tubercula duo ossea," &c., Pallas), but at the same time on close inspection has a few spines beginning to appear on the ridge of the back and on each side of the belly as in *C. lumpus*; but these are not more than $\frac{1}{3}$ the size of those on the middle of the body—the spines on this row (the central one) are much larger than those forming the other rows in a fully armed specimen of *C. lumpus* (as to the rows of tubercles) an inch in length. The fact of these tubercles first making their appearance on this line and beginning to do so near the head, may explain why these only should be described in examples of a certain size.

Mr. Couch mentions with some doubt as to its species, a small *Cyclopterus* taken on the coast of Cornwall. He states that "it is rarely found longer than an inch, and differs from the *C. lumpus* in the skin between the [rows of] tubercles being quite smooth." Linn. Trans. vol. xiv. p. 87. Captain J. C. Ross is disposed to consider it the *Cycl. minutus*, Pall., (App. Ross, 2nd Voy. p. xlvi.) which I am likewise inclined to do in so far as an incidental description will warrant such a conclusion; and at the same time, with the single difference pointed out between it and *C. lumpus*, I should consider it this species, as in the very young state tubercles such as cover over the skin of the adult fish are not apparent.

The specimens otherwise agreeing with the description of *Cycl. minutus*, after having been preserved in spirits for two years, are of an uniform pale dusky tinge; the ground or general colour is light, but being densely dotted over with extremely minute black points, (visible under a lens,) these give the appearance described. As before stated, both specimens of *Gob. minutus*, Mull., have likewise these very minute dots, though much more sparingly; but in addition to them exhibit the larger reddish spots—another individual similar to these in size is of a light colour, blotched with dusky markings

Instead of the spotting on the body, which forms the most prominent character of the *Gob. minutus*, the *Cycl. minutus* is described by Pallas and Turton to be whitish.

The specimens of *Gob. minutus*, *Cycl. minutus* and the smallest *C. lumpus* of adult form, and possessing all the rows of tubercles, have a straight dark line (which in the recent examples of *Gob. minutus* was of a blue colour) extending from each eye to the corner of the mouth just beneath; this does not, however, bespeak identity of species, as in the *Liparis Montagui* I have observed the same marking. All of these specimens but the last are comparatively more elongate in form than the mature *C. lumpus*. A similar remark has been made by Montagu respecting the *Lepadogaster bimaculatus*, the fry of which he states are proportionally longer in the body than the adults. 'Wern. Mem.,' i. 92.

Thirdly.—As favouring the opinion of the identity of *Cycl. minutus*, Pall., and *C. lumpus*, it may be remarked with respect to the three tubercles on the snout, attributed to the former species, that they are likewise possessed by specimens of the *C. lumpus* of the extremes of size examined, one an inch long, (as to the rows of tubercles a well-marked *C. lumpus*,) and another 18 inches in length, equally displaying them.

In the form of the spines or tubercles, a very interesting change takes place, analogous to that in the *Trigla Cuculus* and *T. Gurnardus* (see Annals for February), but to a much less extent, and requiring a much shorter time to be perfected. The armature first appears in a spinous form, thus —in the specimen an inch long, thus  , or like a shark's tooth; and in the individual 18 inches long, thus  —in the adult fish only one slightly projecting central point is generally present; of all the large tubercles on the body of the last-mentioned specimen two only exhibit more than one point: the "spurious dorsal fin" in this fish is a series of compressed tubercles.

The *C. lumpus* occurs in all the localities in which the *Gob. minutus* and *Cycl. minutus* are stated to have been found.

The first of the two latter is mentioned by Muller and Nilsson merely as taken on the shores of Norway; the latter, by Pallas and Capt. J. C. Ross, to have been obtained among floating masses of sea-weed in the Atlantic ocean.

I have had the opportunity of examining specimens of *C. lumpus* (as all are considered to be) taken from the northern to the southern coast of Ireland. Of the individuals particularised in this article, those answering to the *Cycl. minutus*, Pall., were taken at the surface of the sea about Larne (in September 1836) and Drumnasole (in August 1837), in the county of Antrim, by Mrs. Patterson of Belfast, who favoured me with them. In the month of July, a few years ago, Mr. Hyndman (Memb. Nat. Hist. Soc. of Belfast) took in Larne Lough several minute specimens of a *Cyclopterus* under an inch in length, and which, like the *Cycl. minutus* of Pallas, were among masses of sea-weed floating on the surface of the water; but the specimens having unfortunately been lost before they reached me, nothing further can be said of them. Those agreeing with the *Gob. minutus* were, as before mentioned, captured in Strangford Lough*, county Down. In Kingstown harbour, near Dublin, an individual nearly as minute as any here described was taken by Mr. R. Ball and myself, in August 1836, by dredging. A rare fish mentioned by a correspondent as occasionally taken at Wexford, and of which a figure was communicated to me, proved to be this species; and at Youghal examples 18 inches in length have been procured by Mr. Ball—of a similar size is one from the northern coast preserved in the Belfast Museum.

The following notes from my journal on the mature *Cyclopterus lumpus* may not be unacceptable.

March 26, 1835. A large lump-fish, taken near Carrickfergus, was brought to me yesterday morning; but not being purchased, was as a curiosity hawked about the streets of Belfast throughout the day, and by several persons my atten-

* The *C. lumpus* has been described to me as entering this "lough" or arm of the sea, in spring, the period of depositing its ova.

At the island of Lambay, off the county of Dublin, I, early in the month of June last, captured a *Cyclopterus* which was equally minute with those obtained in Strangford Lough, but of a dark colour—it did not possess any tubercles.

tion was directed to it as an extraordinary production; its semi-transparent dull grey colour, much diversified, or apparently begrimed with black, certainly gave it somewhat of a hideous aspect. No purchaser being found here, it was taken this morning to the town of Lisburn, about seven miles distant, and was displayed as on the preceding day, but with more success, as it was here disposed of. This I learned in the afternoon, by the taxidermist to whom it was sent, calling to show it to me as a strange fish just received from the *inland* town of Lisburn, a locality considered to enhance its rarity.

April 8, 1836. To the middle of April, 1835, when I left home, but the one lump-fish had been brought to Belfast market, and the first for the present season was brought hither today. It was taken in the bay along with mullet (*Mugil Chelo*), and was alive when I saw it, although several hours out of the water. As in the specimen of last year, no bright colours were displayed, the general hue being blackish, intermixed with dirty white; the under surface of the latter colour; on close examination a little dull red was visible at the extreme tips of the caudal fin, and the pectorals presented an extremely faint orange tinge. On dissection it proved to be a female, and contained a vast quantity of ova, of a delicate rose colour. The ova alone weighed 25 oz.; of this I had a drachm weighed and carefully reckoned the number of particles, each nearly a line in diameter, that it contained, and found the whole mass, if considered accordingly, would consist of the amazing number of 101,935 ova—the produce of a fish about 15 inches in length. With such prolific powers we can readily imagine that this species should abound, as it is reported to do, in the northern seas of both hemispheres, its chief abode. The stomach did not contain any food.

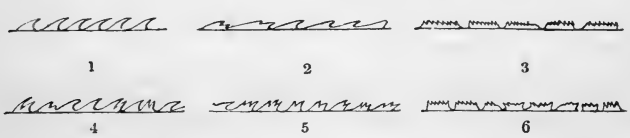
On the 13th of this month another female specimen, of similar size and colour and taken in the bay, was brought to me. On the 20th of this same month two more were, like that of the 8th, captured in the mullet nets at Garmoyle, a deep part of the bay, about three miles from town. One of these, in size and of a blackish colour like those hitherto noticed, proved to be a female; but the other, a much smaller specimen, was of a beautiful deep rose colour on the lower

half of the body, this hue prevailing to a greater extent than the orange represented in Donovan's figure of the species; this was a male fish.

Cuvier remarks, "Le *Cycl. gibbosus*, Will., v. 10. f. 2, ne paraît qu'un Lump male empaillé" (Reg. An. t. 2. 346. 2 éd.), the correctness of which seems to admit not of doubt. It may be added, that Willughby copied his figure from Gesner (lib. 4. paralipomena, p. 26). The hump appears to me to have been a manufacture of the preserver's, probably to add to the effect of the uncouth aspect which the fish at best presents, a conjecture which I venture to make on account of the stretched appearance which the skin presents throughout this dorsal pyramid (hence the appellation of *pyramidatus* bestowed on it in Shaw's General Zoology, vol. v. part 2. p. 390. pl. 167.) in the figure of Gesner, and which is repeated in the works of Willughby and Shaw. Opposed to this view, however, (which might suffice were one specimen only recorded) is the circumstance, that the *C. gibbosus* is stated to have occurred in the Baltic sea, Northern ocean, and (according to Sibbald) on the coast of Scotland.

Note.—As the last Number of the Annals completed a volume, it is now too late to notice in its ordinary place a typographical error there committed. I take this opportunity of correcting it:—At p. 423, under "references to pl. 16," for *Couchia glauca*, read Fig. 3. *Motella quinquecirrata*. Accompanying the drawings, which have been engraved for the last number of the Annals, were sketches of the form of the scales on the dorsal ridge and lateral line of the *Trigla Gurnardus* in the young (*T. Cuculus*), the transition, and the adult state. Had these appeared as wood-cuts or in any way, they would I conceive have convinced the most sceptical as to the identity of these hitherto supposed two species.

[These sketches were accidentally overlooked; we therefore now subjoin them.—Edit.]



1. Form of scales on dorsal ridge of a specimen of *Trigla Gurnardus*.
2. Ditto ditto ditto.
3. Ditto ditto ditto.
4. Form of scales on lateral line of No. 1. ditto.
5. Ditto ditto No. 2. ditto.
6. Ditto ditto No. 3. ditto.

BIBLIOGRAPHICAL NOTICES.

A History of British Zoophytes. By George Johnston, M.D., with 44 Plates and 80 Wood Cuts. Lizars, Edinburgh; Highley, London; and Curry and Co., Dublin. 1838.

It was in the year 1755 that John Ellis, a bright name in the list of British Philosophers, first earnestly directed the attention of our zoologists to the study of the native zoophytes by the publication of his admirable 'Essay towards a Natural History of the Corallines commonly found on the coasts of Great Britain and Ireland.' His clear descriptions and excellent illustrations first convinced naturalists of the animal nature of those bodies. Yet, though his book was interesting in the extreme, and though the beauty of the objects described offered great inducements to those who loved to study nature, not in books only but in her living works, few occupied themselves with the pursuit. A meagre and compiled list of British zoophytes appeared in Turton's 'British Fauna;' a number of disconnected and generally imperfect observations were made by various persons; rarely our scientific Transactions and Journals contained some excellent Memoir on some detached species or perhaps genus; and in Dr. Fleming's 'British Animals,' a classification and synopsis of the species to him known as British was presented—a list which greatly facilitated the study—but no separate work appeared on the subject. At length, however, it has been taken up in a worthy manner by Dr. Johnston in the volume before us, and the student may now pursue his researches with a safe and ample manual to guide him. Not merely will he study Dr. Johnston's work with advantage, but also with pleasure; for the learned author records his observations amusingly as well as scientifically, and brings the varied reading of a discursive and elegant mind delightfully to bear upon an abstruse and intricate subject. It is indeed strange, the study of zoophytology should not have become as popular as that of conchology and entomology, or other favourite natural history pursuits. The forms of the Polypes are beautiful and singular in the extreme, witness the corallines; and as to colour, what animals can vie in gorgeous hues with the *Actiniadæ*? Their habits too are interesting and easily observed; and if ladies who live near the sea but knew such things were, corallines and sea flowers might ornament the drawing-room as well as gold-fish, and with much more benefit to science.

Dr. Johnston prefaces his account of the species of British zoophytes by three excellent dissertations. I. *On the History of Zoo-*

phytology. II. *On the Structure and Physiology of Polypes*; and III. *On their Classification.* In the last he presents us with a classification of his own. Rejecting sponges altogether, considering them as more nearly allied to vegetables than to animals, he divides zoophytes into two sub-classes, first "radiated zoophytes," and second, "molluscan zoophytes;" the animals of the first sub-class having a symmetrical contractile body, and their mouth and anus in one; those of the second sub-class having a non-contractile non-symmetrical body, and two openings to the digestive apparatus. Under the first sub-class he places his three orders of Hydroida, Asteroida, and Helianthoida; under the second that of Ascidioida. This is a great improvement on the classification of zoophytes published by M. Blainville in his 'Manuel d'Actinologie,' but would appear exactly to coincide with the present views of that author, as lately published by M. Holland, a disciple of the great French naturalist in his 'Manuel de Zoologie,' wherein the class of "Polypiares" (corresponding to Dr. Johnston's restriction of the zoophytes) is divided into four sub-classes, "Les Hydriens, les Alcyoniens, les Actiniens, et les Polypes douteux." This correspondence of the present views of M. Blainville with those maintained by Dr. Johnston goes far to support the systematic ideas of the latter. The older arrangements being founded mainly on artificial distinctions, such as the presence or absence of a polypidom, must now be entirely laid aside along with systems of conchology in another department of zoology, having served their purpose and now only tending to retard the science they once advanced.

Dr. Johnston's first order, Hydroida, comprises eleven genera, including fifty species. In the first genus, *Hydra*, the *H. brunnea* of Templeton is referred to *H. vulgaris*, and the *Hydra corynaria* of the same naturalist (*Hydra lutea* of Fleming) has its name changed to *Hydra littoralis*, not being identical either with the *Hydra lutea* or *erynaria* of Bosc. The *Coryne glandulosa* of Lamarck is made the type of a new genus, *Hermia*, thus characterized:—

> "*Polype fixed, sheathed in a thin horny membrane, clavate or branched and subphytoidal, the apices of the branches clubbed and furnished with scattered glandular tentacula; mouth* 0."

A new species of *Thoa* is dedicated to Mr. Bean of Scarborough. *Sertularia pinnata*, Templeton, is styled *S. hibernica*. *Antennularia ramosa* is considered a variety of *A. antennina*.

In the second order, Asteroida, five British genera are enumerated, including seven truly native species and several doubtful.

The order Helianthoida includes five genera and thirteen British species. On the genus *Actinia* Dr. Johnston makes a number of interesting remarks, the evident fruits of a careful study of the native species. Many will differ with him however as to the union of some of his synonyms. The *Actinia margaritifera* of Templeton, judging from the figure in the Magazine of Natural History, is surely something different from *A. mesembryanthemum*, as also *A. viduata*, Muller, which does not only differ from the common species in colour, but also in habit and shape, being always much more elongated. Though living almost invariably in sand, its peculiarities are not to be attributed solely to its habitat; since when *A. mesembryanthemum* is found in such a situation it retains its true characters. Under *Actinea gemmacea* we find united *A. verrucosa*, Lam., *A. monile*, Templeton, *A. senilis* Decquemare, *A. equina*, Sow., and several other supposed species. Though in so doing the author has much reason on his side, yet it is likely that several distinct forms have been passed over in the British seas, as *A. gemmacea*.

The statement that the littoral varieties "are always strongly warted" and "coated with particles of broken shells," &c., while the deep water specimens are generally clean, showing more vivid and varied tints, though a pleasing inference of adaptation of instinctive habit to circumstances is drawn from it, is not always borne out by fact. For instance, this species abounds at half tide at Newhaven and other places on the shores of the Frith of Forth; more vividly coloured or smoother creatures can scarcely be imagined; whilst such as are dredged in deep water in the Irish sea are generally dull in colour, and covered with broken shell. To the localities of *Actinia maculata* may be added the coasts of Man, where it is extremely common on old *Fusi* and *Trochi* in deep water. There the shells to which this beautiful animal attaches itself are not *always*, indeed seldom, inhabited by the hermit-crab, neither is the horny base always present. This *Actinia* seems to change its habitation according to its size. There are so many differences between it and the other species, that it may be regarded as the type of a distinct genus. In the wood-cut the tentacula are represented as much too few, and in the living animal the mouth is bilobed, with two distinct rows of tentacula encircling it. The lobing of the body is seen in all specimens whether embracing or simply on the surface of a shell. In addition to Dr. Johnston's references may be mentioned some interesting notes on this animal in Chiagi's Memorie, vol. ii. p. 243.

For the *Actiniæ* with non-retractile tentacula, Dr. Johnston constitutes a new genus, *Anthea*, with the following character:—

Body cylindraceous, adhering by a broad base; tentacula disposed in circles round the mouth, elongated, tapering, and incapable of being retracted within the body.

It is the same with "*Anemonia*" of Risso. Two species are recorded, *Anthea cereus* and *A. Tuediæ*. Local names are always objectionable, more especially when the distribution of the species is known to be wide, and when it has already received a name. Would it not have been preferable to have followed Risso, and styled the second species *A. edulis*? By the way, is it not full time for naturalists to reconcile the strange diversity of opinion as to the nervous system of *Actinia*? Somebody must be in error, one set of observers declaring there is little or no trace of a nervous system, and another (including Dr. Grant) asserting that the nervous system is well known and evident. In several popular works on natural history a diagram of the nerves at the base of the *Actinia* is figured, without a note to mention the doubts regarding it. See, for instance, the article "*Actinia*" in the 'Penny Cyclopædia.'

In the order Ascidioida, Dr. Johnston enumerates twenty-three genera and seventy species. The complicated structure and singular polypidom of the zoophytes of this order render them objects of great interest. To Dr. Farre we are indebted chiefly for our knowledge of their organization. Dr. Johnston gives an excellent abstract of Dr. Farre's researches and a very complete history of the British species. In this order the genus "*Berenicea*" of Fleming is styled "*Lepralia*," the former name being preoccupied. One new species, *Lepralia variolosa*, is described. Doubtless many unrecorded forms of these curious Lichens of the animal kingdom exist on our shores. A new *Flustra* (*F. Murrayana*, Bean, MSS.) is also characterized. The *Alcyonidium echinatum* and *parasiticum* are so different in habit from the other two native species, that it might be advisable to separate them from the genus with which they are at present associated. Under *Alcyonella* will be found a most interesting account of that singular polype, and lastly, the *Plumatella sultana* found in Berwickshire by Sir John Graham Dalyell, is added to the British Fauna.

The plates and cuts which ornament Dr. Johnston's work are admirable and need no comment. They, of themselves, are most important additions to the natural history of our country, and for the most of them we are indebted to the taste and skill of his lady. Many and valuable have been the contributions to natural science by the ladies of Britain, and often have their good services earned the philosopher's gratitude and admiration. From the publication of Lister's admirable folio on shells to the appearance of the delightful

book before us, the pencil and the graver have often been wielded by their hands and guided by their eyes.

Much yet remains to be done in British zoophytology. Dr. Johnston's volume is the herald of much research, and we trust he will continue his own studies, whilst he has enabled others to commence theirs. From Sir John Dalyell too, so often referred to in the volume before us, much is to be expected. The fragments on polypi, which that learned observer has already put forth, announce facts so strange and novel, that every British zoologist looks forward anxiously to the publication of his long-promised volume. In the allied classes of *Echinodermata* and *Arachnodermata* our Fauna is sadly confused. May we not look to Dr. Johnston for a clearing up of these subjects? The admirable manner in which, although surrounded by difficulties and occupied by professional engagements, he has elucidated the natural history of our zoophytes, is a sufficient pledge for the mode in which the task would be performed.

We have great pleasure in being able to announce the appearance of the first part of the 1st vol. of a 'Flora of North America,' containing abridged descriptions of all the known indigenous and naturalized plants growing north of Mexico, arranged according to the Natural System, by Dr. John Torrey and Dr. Asa Gray. When we consider the extent of country embraced by this Flora, from Key west in Florida, lat. 25 S., to the extreme arctic regions, and from Newfoundland in the east to California and Behring's Straits in the west, this may well be looked upon as a gigantic undertaking, and such as few, if any, are so able to accomplish as the well-known botanists now mentioned. They have been engaged for a series of years in making preparations for this publication, and they have met with the most powerful assistance from every person who has taken an interest in the botany of that immense continent. "The value of this Flora," they assure us, "will be greatly enhanced by the extensive contributions of Mr. Nuttall, who has communicated to us for publication his notes and descriptions of the plants collected in his recent journey to Oregon and California, by way of the southern ranges of the Rocky Mountains. Mr. Nuttall's collections are very interesting, and comprise a large number of new genera and species, a considerable portion of which were obtained in a region never before visited by botanists." We cannot give a better idea of the great progress of American botany than by comparing the number of certain species contained in certain orders or genera as published by Pursh in 1815, and Drs. Torrey and Gray in the present work, published in 1838.

	Torrey and Gray.	Pursh.
Ranunculaceæ	135	73
Cruciferæ	265	49
Viola	32	22
Hypericum (including Elodea)	38	27
Paronychia	8	2
Arenaria	29	13
Stellaria	19	3
Cerastium	10	6
Silene	23	7
Claytonia	17	5
Sida	19	8
Ceanothus	19	5
Vicia	15	5

and other lesser genera in similar proportion. The work it is intended shall be completed in three closely printed 8vo volumes, each of about 550 pages; but as considerable time will necessarily be occupied in the publication of the work, it is intended, for the greater convenience of botanists, to issue the volumes in separate parts as soon as printed. The first volume, therefore, which will comprise the Exogenous Polypetalous plants, will appear in three parts of about 184 pages each; of which the first part is just published; the second is now nearly completed, a considerable portion of the printed sheets having been forwarded to us; and the third will follow as soon as is convenient with its faithful execution.

We also gladly take this opportunity to announce the arrival of the second part of this invaluable work in this country, brought, indeed, by one of the authors himself, Dr. Gray, who is come to visit the collections of American plants in England and upon the Continent, so as to clear up many dubious points in the species and synonyms; a labour in which we know he has been eminently successful, and which will stamp a great additional value on the work in question. The second part, although comprising the proper complement of pages, does not bring us to the conclusion of the *Leguminosæ*, a family of plants in which N. America is eminently rich, particularly in *Astragaleæ*. *Astragalus* alone includes 40 species; *Oxytropis*, 16; *Phaca*, 31: and *Homolobius*, a new genus of Nuttall with the aspect of *Phaca* and the legumes almost of *Vicia*, 10 species. Of *Psoralea* there are 27 species; of *Petalostemum*, 13; of *Trifolium*, 33, of which 12 belong to that beautiful group with involucrated capitula. It gives us pleasure to find Mr. Douglas' Texas plants included in this work.

We flatter ourselves that the 'Flora of North America' will meet with all the encouragement its high merit entitles it to.

Genera Insectorum Iconibus illustravit et descripsit Dr. H. Burmeister. Vol. I. *Rhyncota.*

Under this title Prof. Burmeister has begun a work, which in the field of Entomology, can only be compared with those of Curtis and Percheron-Guerins, and which, while it is not as the former limited to a Fauna, is neither inferior to it in elegance or in the accuracy of its execution; and is to be preferred to the latter (which it appears is discontinued) from the greater care with which the subject is treated, and from the method adopted of placing the nearly allied genera together. The author's previously published observations on this order in the 'Manual of Entomology' may serve as basis to the present work. The first parts contain:—

Lystra, with characters of seven species, illustrated by *L. auricoma* from Mexico, which externally has a great resemblance to *Phenax*, the second genus here described, the analyses of which are subjoined on the plate of the former genus. *Acocephalus* represented by *A. costatus*, Germ. *Bythoscopus* divided into four sub-genera: *Bythoscopus* (*Flatta varia*, F.), *Idiocerus Lewis* (illustrated by *Jassus fulgidus*, F.), *Oniopsis* (by *B. lanio*), and *Pediopsis* (*B. tiliæ*, Germ.). *Eurymela* with five species, of which the most known, *E. fenestrata*, is chosen for the illustration of the genus. Erichson, *Bericht über Entomologie, Wiegmann's Archiv.* Part V. 1838.

Second Annual Report and Proceedings of the Botanical Society of Edinburgh. Session 1837–8. 8vo. Printed for the Society.

We have had much satisfaction in perusing the Second Annual Report of this Society; it is rapidly advancing in importance; and if the same zeal and union of feeling continue to influence its members, it will in a very short period stand at the head of the Botanical Associations in Britain. Its correspondence and herbarium are already extensive, and the distributive plan which has been adopted in regard to the latter will quickly increase it, whilst that of keeping a paid Assistant-Curator will at once prevent any falling off or confusion amidst the increasing work of the Society.

The Report contains a general notice of the present state of the Society, prepared by the Committee of Management; a digest of the proceedings at the Society's meetings, the greater part of which has appeared from time to time in our pages; a list of office-bearers for the year; of the members divided into classes; contributors to the herbarium, donations to the library, &c.; and is preceded by extracts from a report on the 'Progress and State of Botany in Britain from

February 1837 to March 1838,' by Professor Graham, as President; a practice which it is proposed to continue annually, and which will prove most useful, tending to carry on the members from year to year with the progress of their science, and by comparison to excite them to continued exertion.

From the General Report we learn that Her Majesty the Queen has been graciously pleased to become patron to the Society, thereby giving a sanction to its conduct and proceedings, which must prove of the utmost consequence. Another important event is the proposal on the part of the Society for a union of their herbarium with that belonging to the University: this has been favourably entertained by the patrons and the senate, and the arrangements for effecting the desired union are said to be nearly completed. The first edition of the Society's Catalogue of British Plants being nearly disposed of, a second is in preparation. A diploma and seal have been completed, and may now be had by members on application to the Treasurer or Secretary. The number of members of different classes belonging to the Society at the date of this report is 199. Specimens from the herbarium have been distributed during the past year to 95 public bodies or members.

The first volume has appeared of a '*Flora of Jamaica*, or a Description of the Plants of that Island, arranged according to the Natural Orders; with an Appendix, containing an Enumeration of the Genera according to the Linnæan system, and an Essay on the Geographical Distribution of the Species.' By James Macfadyen, M.D., F.L.S. Dr. Macfadyen was appointed some years ago to the charge of the Government Botanic Garden at Kingston in Jamaica, where he acquitted himself to the great satisfaction of the country, until the dissolution of that valuable establishment; since which event he has devoted what time he could spare from the duties of an extensive medical practice to the collecting materials for the Flora in question, which has long been a desideratum in the botanical world. "As for my own share of the labour," Dr. Macfadyen remarks in the Preface, "I may be allowed to state, that it has occupied a great portion of my leisure during a residence of upwards of twelve years in the island. I have carefully examined the characters of every plant within my reach, and compared my own descriptions with those of preceding botanists. I have visited a considerable portion of the island, so that I have had opportunities of studying the peculiarities of the Flora of each district. The nature also of my occupation, as a medical practitioner in the country, has been of some

advantage, as in my almost daily rides I have had opportunities of watching each plant during its period of flowering and perfecting its fruit. There still remains, however, an extensive and interesting field for botanical research; there are still left many plants undiscovered and undescribed, a rich reward to stimulate to exertion those who may follow in the same path. It is not the work of a single individual, even if favoured with unusual length of life, and gifted in the highest degree with mental and bodily energy, to complete a perfect history of the botany of an island like Jamaica. It would have been vain for me, in hope of accomplishing this, to have waited from year to year, exposed to many contingencies and accidents, any one of which might have rendered all my labours in vain, and all the information I have acquired as if it had never been known. I have therefore taken the present opportunity to offer the result of my labours to the public, trusting it will be found to give a tolerably accurate account of what is at present known of the vegetable productions of this island, and in the hope that it may prove serviceable to those who in after times may follow in the same course, and engage, under more favourable auspices, in the task of perfecting the history of the Flora of Jamaica."

PROCEEDINGS OF LEARNED SOCIETIES.

LINNÆAN SOCIETY.

Dec. 4.—Edward Forster, V.P., in the Chair.

Read, "Observations on the Anatomical and Physiological Nature of Ergot in certain Grasses." By E. J. Queckett, Esq., F.L.S.

Having had the opportunity of examining the formation of the ergot in several grasses, the author has endeavoured to trace the cause and origin of this singular formation on them, and particularly on *Elymus sabulosus*.

It was found, that when a grain of the grass was to be replaced by an ergot, it presented before the period of expansion of the flower a singular mildewed appearance. This, when examined microscopically, was seen to consist of filaments, at whose base were myriads of particles of exceedingly diminutive size, forming a complete coating to the young grain, so that no part of its body was visible through it.

From this state the increase of the young ergot, but not of the filaments and particles, was very rapid, for in a short time after, when the ergot began to appear between the paleæ of the flower, its violet

black colour was then visible, on account of the mildewed appearance not keeping pace in development with the Ergot*.

After the ergot begins to appear beyond the paleæ, it in a short time attains its full size, and loses almost entirely its mildewed covering, presenting now its perfect violet black surface, and measures in different specimens from half an inch to one inch and half.

If the ergot be examined carefully at this period, in such specimens as have not been subjected to injury or displacement on the plant, it will be found that at its base are the two scales which are observable in the same place in the healthy grain, and that it is articulated to the receptacle, and separates from it as readily as the grain when ripe does from the same spot, and at the apex of it is a small body, frequently hairy, on which can be observed the remains of the stigmas.

From the relations of the ergot to these parts, and compared with those of the healthy grain, it is found that it is placed between and upon the same organs as the grain, and there cannot be a doubt but that this singular body is not an independent fungus, but a grain diseased from causes presently to be mentioned.

When the particles before mentioned, which occur on the surface of the ergot, and are also found in a viscid fluid that hangs about the paleæ of the infected grass, are examined by the microscope, their size is found to be $\frac{1}{400}$ part of an inch in length, and $\frac{1}{8000}$ part of an inch in diameter in the generality of instances, and their number is countless, probably 20 millions on each ergot. When magnified from 500 to 800 times, it then can be observed that their interior contains several well-defined green dots or granules, two or three being the most common numbers.

If these particles, which are no doubt the cause of the ergot, as they are found on every ergotized grass and are sporidia of a certain fungus, be kept moistened on any convenient surface, as between a plate of glass and talc, they soon commence germinating (if recent) in various ways; sometimes by emitting a tube or tubes containing green granules, similar to those in the interior of the sporidia, and which probably separate finally into as many perfect reproductive atoms; in other instances one sporidium gives off a minute process from its side, which goes on increasing and ultimately becomes like

* The growth of the ergot is very rapid when compared with that of the grain. Philippar, in his 'Traité Organographique et Physiologico-agricole sur l'Ergot, &c., dans les Céréales', observed some particular plants of rye, whilst passing by a certain cornfield, which had no appearance of ergot, but ten or twelve days after these same plants had full-sized ergots upon them.

its parent, and then separates from it. Often several sporidia so generated, remain united to each other for a short time, forming a moniliform filament, composed frequently of seven or eight joints.

The next and last method is the most perfect when it is found that the sporidia have their cavity divided by a septum, which is formed by a green granule of the interior extending itself laterally; each half of each sporidium being again subdivided, and by endless repetitions of this process a radiated plant is produced, which, when arrived at a certain size and age, bears upon its branchlets sporidia similar to that one from which it was first produced.

From these observations, it is proved that the sporidia, found on the surface of the diseased grain can germinate and ultimately develope the means of their reproduction, without forming any body analogous in shape or structure to an ergot, which fact is conclusive that the filaments and sporidia are no part of that body, because they are found to flourish unconnected with it, and even grow on many parts of the same grass, as seen in the anthers by Mr. Smith, of Kew Gardens, and observed by Mr. Queckett on the paleæ, glumes and rachis; therefore the ergot, Mr. Queckett conceives, originates by the grain of the respective grass becoming diseased, from the presence of a parasite, which occasions such alteration in its developement as to cause it to assume the well-known form, and to possess also the singular properties manifested in that of rye.

If the ergot be sliced into thin transverse sections, and these examined with a very high magnifying power, it will be seen that numerous particles escape from them when they are placed in water. These have been taken by Philippar for sporidia, from which circumstance he considered the ergot as the reproductive apparatus of a fungus; but such particles are only those of a fatty oil, which escape from the divided cells, and collect on the surface of the water, in which the sections are immersed, and differ from the sporidia of the exterior by floating on the surface, whilst the latter always subside to the bottom of the vessel containing the water. The application of heat to these supposed sporidia fuses them into irregular masses of different sizes, and ether or turpentine, if allowed to evaporate after being added to them, leaves similar appearances.

The internal structure of the ergot looks extremely irregular, there being no equally formed cells, but a confused jumble, out of which can scarcely be traced the true cells, on account of their boundaries being exceedingly sinuous, which structure is very like the centre of the fungus produced during the germination of the sporidia, and appears to be occasioned by fungoid matter having grown in the interior of the grain.

From these observations, which have been followed up in many ergotized grasses, Mr. Queckett is inclined to believe that the ergot is a grain diseased by a particular parasitic fungus developing in or about it, whose sporidia find the young state of the grain a matrix suitable for their growth, and quickly run their race, not entirely depriving it of its vitality, but communicating to it such impressions, which pervert its regular growth, and likewise the healthy formation of its constituents, being at last composed of its diseased materials, which are mixed up with fungic matter, which has developed within it.

The fungus caused to germinate in the way described is quite invisible to the naked eye, seldom measuring beyond the one or two hundredth part of an inch; and from comparisons with British and foreign genera of Fungaceæ, it has not been found that it belongs satisfactorily to any as at present constituted; the author therefore proposes a new genus, with the title *Ergotætea*, to represent this minute fungus, which will belong to the sub-order *Coniomycetes* of Fries, and to its division Mucedines, very near to the genus *Sepedonium*.

After repeated experiments with the sporidia of the ergot of rye, of *Elymus*, and other grasses, the author has always succeeded in making them germinate, and has not discovered such differences as would lead him to consider that the parasite in each case was not the same, therefore he has applied the term *abortans*, as the specific name of *Ergotætea*, to the plant found on the ergot of rye, and believes the parasites, on the other grasses which have been examined, to be of the same species.

December 18.—Edward Forster, V. P., in the Chair.

Read, "A notice of *Cereus tetragonus*," by Edward Rudge, Esq., F.R. & L.S.

This plant has blossomed during the three past years in Mr. Rudge's collection at Abbey Manor House near Evesham. The flowers expand in the evening like those of *C. grandiflorus*, which they resemble, but are not above half the size. The number of the angles of the stem is variable. The species is an old inhabitant of our stoves, but has rarely flowered.

Read, "Descriptions of the Indian species of *Iris*," by D. Don, Esq., Libr. L.S., Prof. Bot. King's College.

The number of species of this beautiful genus belonging to the Indian Flora is five, three of which have not been previously described: one of the species is from Cashmere, another from Ludak,

a country situated beyond the Himalaya, and the remaining three are natives of Nepal and Kamaon, and of the country to the westward.

The following are the characters of the undescribed species:

1. *I. kamaonensis* (Wall. Cat. n. 5052.), barbata; scapo brevissimo unifloro, tubo perianthii longissimo subfiliformi, sepalis inferioribus bilobis, longe unguiculatis, ovario turbinato, 3-gono.
2. *I. longifolia* (Royle Ill. t. 91. f. 2.), imberbis; foliis margine scabris, scapo brevissimo unifloro, sepalis sublanceolatis integerrimis, tubo perianthii vix ullo, ovario elongato triquetro scapum adæquante, stigmatis lobis integerrimis.
3. *I. Moorcroftiana* (Wall. Cat. n. 5051.), imberbis; scapo bifloro pedunculis breviore, spathis glumaceis, tubum perianthii superantibus, sepalis lanceolatis acutiusculis, ovario 6-sulcato.

Read, "Additional observations on the *Spongilla fluviatilis*." By John Hogg, Esq., M.A., F.L.S.

The author's views of the vegetable nature of the river sponge were given in a paper read before the Society on the 5th of June, 1838, a report of which was inserted in the August number of the 'Annals of Natural History.'

The present paper contains additional observations in confirmation of these views, derived from a more accurate examination of the seed-like bodies, which are found adhering in abundance to the walls of the cells or cavities of the sponge, and also frequently free and endowed with the faculty of locomotion; and which have been regarded by some authors as the ova of the *Spongilla*, and by others as those of the *Plumatella*. Mr. Hogg has determined the identity of these bodies, having succeeded in raising young *Spongilla* from both kinds; and he has also ascertained that they are destitute of cilia, being merely studded with minute granular papillæ. The motions of the unattached bodies resemble those observed by Unger in the sporules of *Ectospora clavata*, and Mr. Hogg considers the currents to be due to the same causes, which affect the circulation of the fluids in the cells of vegetables.

Jan. 15, 1839.—Edward Forster, V. P., in the Chair.

Read, "A notice of the *Encephalartos horridus*, which flowered at Kinmel Park." By Mr. Thomas Forrest. Communicated by the Secretary.

This brief notice was accompanied by the male spadix, which had flowered at Kinmel Park, the seat of Lord Dinorben, and was sent for exhibition to the meeting by command of His Royal Highness the Duke of Sussex. The plant had been sent to Lord Dinorben from

the Cape of Good Hope about six years ago by Lord John Spencer Churchill, Capt. R.N. The spadix was of unusual size, and bore a strong resemblance to a gigantic pine cone. The most remarkable peculiarity observable was, that several scales, less developed than the others, bore only one mass of anthers, whilst in others the two masses were confluent.

Read, "An account of the Indian Species of *Juncus* and *Luzula*." By D. Don, Esq., Libr. L.S., Prof. Bot., King's College.

The species described in this paper are all from Northern India, and were mostly collected by Dr. Royle in the range of the Himalaya, included between the Ganges and Sutlej. Of the eight species described, seven belong to *Juncus*, and only one to *Luzula*. Three of the former genus are entirely new, two had been previously gathered by Dr. Wallich's collectors in Nepal, and of the two others, one (*J. bufonius*) is common throughout the northern hemisphere, and the other (*J. glaucus*) is abundant in northern and central Europe. The *Luzula* is *spicata*, which occurs on the mountains of the north of England, Scotland, and throughout Europe, reaching as high as 71° north latitude, and which is likewise found on the Caucasus and Altai mountains in northern Asia. The present variety is from Lippa in Kunawur, a country situated beyond the Himalaya, in about 31° 33′ north latitude, being about 11° more to the south than any station previously recorded for *Luzula spicata*. The variety differs in its broader sepals, blunt capsule, with obovate valves, and in the seeds not being above half the size.

We subjoin the characters of the new species.

1. *J. leucanthus* (Royle), culmo bifolio tereti, foliis margine involutis filiformibus culmum subæquantibus, capitulo terminali solitario 6—10-floro, involucro 5-phyllo glumaceo floribus longiore, sepalis acutiusculis, antheris acutis filamentis duplo longioribus, ovario incluso, stigmatibus stylo ter brevioribus.

This species is nearly allied to *J. triglumis*.

2. *J. leucomelas* (Royle), culmo enodi filiformi aphyllo, foliis subulatis, canaliculatis, capitulo terminali 3—5-floro, involucro 3-phyllo acuto breviore, sepalis obtusis, antheris filamentorum fere longitudine, capsula acuminata perianthio longiore.
3. *J. membranaceus* (Royle), culmo tereti subdiphyllo, foliis subfiliformibus obtusis, capitulo terminali solitario 4—8-floro bractea communi membranacea breviore, sepalis obtusis capsula acuta longioribus, staminibus inclusis, antheris filamentis dilatatis ter brevioribus.
4. *J. concinnus* (Don. Prodr. Fl. Nepal, p. 44), culmo tereti subdiphyllo, foliis planiusculis obtusis, capitulis 3—6-floris corymbosis, bractea communi elongata foliacea, sepalis acutis, capsula acuta longioribus,

staminibus longe exsertis, antheris filamentis simplicibus 6-plo brevioribus.

5. *J. indicus*, triandrus; capit ulis multifloris squarrosis trichotome cymosis, sepalis lineari-lanceolatis apice mucronatis recurvis capsulæ muticæ longitudine, stigmatibus sessilibus.

ROYAL IRISH ACADEMY.

December 10.—Sir W. R. Hamilton, A.M., President, in the Chair.

Mr. Ball read a paper, entitled "Description of the *Cydippe pomiformis*, Patterson, (*Beröe ovatus*, Flem.,) with notice of an apparently undescribed species of *Bolina*, also found on the coast of Ireland." By Robert Patterson, Esq., Member of the Natural History Society of Belfast.

The author referred to a paper of his published in the 'Edinburgh New Philosophical Journal' for January 1836, giving some account of a tentaculated *Beröe* taken in abundance by him at Larne Lough, County of Antrim, in the spring of 1835. He then noticed the occurrence on different occasions in 1836–7, of a *Beröe*, exhibiting a peculiar ramiform arrangement of whitish internal vessels, branching off from near the lower part of the stomach to the several bands of cilia; and detailed the observations by which he was enabled to identify this with the *Beröe* described in 'Mem. Wer. Soc.,' vol. iii. p. 400, by Fleming,—the tentacula having escaped the notice of that writer from the specimen he examined having been in an exhausted state when these organs were retracted within the body. The presence of the tentacula removes the animal from the genus *Beröe* of Fleming, to the *Pleurobrachia* of the same author (*Cydippe* Eschs.) and as the specific name *ovata*, under which it was described in the 'Hist. of Brit. Animals,' has been applied to a different species, Mr. Patterson proposed that it should be designated as the *Cydippe pomiformis*.

The disappearance of the internal ramiform vessels was next noticed, and the steps by which the writer was enabled to ascertain that the species now brought forward was identical with that described by him in 1835; and consequently, that a *Beröe*, of the occurrence of which we have no record, except of one individual taken in 1820, was abundant on the Irish coast. Particular reference was made to Dr. Grant's paper, 'Zool. Trans.' vol. i. p. 9, on *B. pileus*, with a view to indicate the several points of agreement and of difference between these, the only two British species of tentaculated *Beröes*. The structure of the cilia, the aqueous currents at their base, the position and structure of the tentacula, the food of the *Beröe*, its vitality, consistency, want of phosphorescence, movements,

iridescence, times of appearance, and diffusion round the coast, formed the principal topics embraced in the remainder of the paper.

The occurrence of the *Bolina* on different parts of the Irish coast was mentioned, principally for the purpose of enabling Mr. Patterson to refer to some points of its œconomy for comparison and contrast with the *C. pomiformis*. He reserved a detailed account of various particulars concerning it to a future opportunity, when he expected to be able to exhibit additional figures taken from living specimens, and more accurately delineated than those at present brought forward. Meantime, as the animal differed from the two species of *Bolina* described by Mutius, he proposed to name it provisionally *Bolina Hibernica*.

GEOLOGICAL SOCIETY.

Nov. 21, 1838.—A paper was read "On the Jaws of the *Thylacotherium Prevostii** (Valenciennes) from Stonesfield," by Richard Owen, Esq., F.G.S., Hunterian Professor, Royal College of Surgeons.

Doubts having been recently expressed by M. de Blainville†, from inspection of casts, respecting the mammiferous nature of the fossil jaws found at Stonesfield, and assigned to the Marsupialia by Baron Cuvier, Mr. Owen brought the paper before the Society, to meet the objections and give a detailed account of the fossils from a careful inspection of the originals. In this communication, however, he confined his description chiefly to the jaws of one of the two genera which have been discovered at Stonesfield, and characterized by having eleven molars in each ramus of the lower jaw, reserving to a future occasion an account of the remains of the other genus‡.

Mr. Owen commences by observing that the scientific world possesses ample experience of the truth and tact with which the illustrious Cuvier formed his judgements of the affinities of an extinct animal from the inspection of a fossil fragment; and that it is only when so distinguished a comparative anatomist as M. de Blainville questions the determinations, that it becomes the duty of those who possess the means to investigate the nature of the doubts, and reassure the confidence of geologists in their great guide.

When Cuvier first hastily examined at Oxford, in 1818, one of

* Comptes Rendus, 1838; Second Semestre, No. 11, Sept. 10, p. 580.

† Ibid., No. 8, Août 20, p. 402 *et seq.*; No. 9, Planche; No. 17. Oct. 22, p. 727; No. 18, Oct. 29, p. 750.

‡ This has since been read, and an abstract of it will appear in one of our next numbers.—EDIT.

the jaws described in this paper, and in the possession of Dr. Buckland, he decided that it was allied to the Didelphys (me semblèrent de quelque Didelphe) *; and when doubts were raised by M. Constant Prevost, in 1824†, relative to the age of the Stonesfield slate, Cuvier, from an examination of a drawing made for the express purpose, was confirmed in his former determination; but he added, that the jaw differs from that of all known carnivorous Mammalia, in having ten molars in a series in the lower jaw: ("il [the drawing] me confirme dans l'idée que la première inspection m'en avoit donnée. C'est celle d'un petit carnassier dont les mâchelières ressemblent beaucoup à celles des sarigues; mais il y a dix de ces dents en série, nombre que ne montre aucun carnassier connu." Oss. Foss. 111. 349. note.) It is to be regretted that the particular data, with the exception of the number of the teeth, on which Cuvier based his opinion, were not detailed; but he must have been well aware that the grounds of his belief would be obvious, on an inspection of the fossil, to every competent anatomist: it is also to be regretted that he did not assign to the fossil a generic name, and thereby have prevented much of the reasoning founded on the supposition that he considered it to have belonged to a true Didelphys.

Mr. Owen then proceeded to describe the structure of the jaw; and he stated that having had in his possession two specimens of the *Thylacotherium Prevostii* belonging to Dr. Buckland, he has no hesitation in declaring that their condition is such as to enable any anatomist conversant with the established generalizations in comparative osteology, to pronounce therefrom not only the class but the more restricted group of animals to which they have belonged. The specimens plainly reveal, first, a convex articular condyle; secondly, a well-defined impression of what was once a broad, thin, high, and slightly recurved, triangular, coronoid process, rising immediately anterior to the condyle, having its basis extended over the whole of the interspace between the condyle and the commencement of the molar series, and having a vertical diameter equal to that of the horizontal ramus of the jaw itself: this impression also exhibits traces of the ridge leading forwards from the condyle and the depression above it, which characterizes the coronoid process of the zoophagous marsupials; thirdly, the angle of the jaw is continued to the same extent below the condyle as the coronoid process reaches above it, and its apex is continued backwards in the form of a process;

* Ossemens Foss., tome iii. p. 349.

† Annales des Sciences Nat., Avril, 1825; also the papers of Mr. Broderip and Dr. Fitton in the Zoological Journal, 1828, vol. iii., p. 409.

fourthly, the parts above described form one continuous portion with the horizontal ramus of the jaw, neither the articular condyle nor the coronoid being distinct pieces as in reptiles. These are the characters, Mr. Owen believes, on which Cuvier formed his opinion of the nature of the fossil; and they have arrested the attention of M. Valenciennes in his endeavours to dissipate the doubts of M. de Blainville*.

From the examination of a cast, the latter, however, has been induced to infer that there is no trace of a convex condyle, but in place thereof an articular fissure, somewhat as in the jaws of fishes; that the teeth, instead of being imbedded in sockets, have their fangs confluent with or anchylosed to the substance of the jaws, and that the jaw itself presents evident traces of the composite structure.

In answer to the first of these positions, Mr. Owen states that the portion of the true condyle which remains in both the specimens of Thylacotherium examined by Cuvier and M. Valenciennes, clearly shows that the condyle was convex, and not concave. It is situated a little above the level of the grinding surface of the teeth, and projects beyond the vertical line, dropped from the extremity of the coronoid process, but not to the same extent as in the true Didelphys. In the specimen examined by M. Valenciennes, the condyle corresponds in position with that of the jaw of the Dasyurus rather than the Didelphys; it is convex, as in mammiferous animals, and not concave as in oviparous. The entire convex condyle exists in the specimen belonging to the other genus, Phascolotherium, now in the British Museum, but formerly in the cabinet of Mr. Broderip. Mr. Owen is of opinion that the entering angle or notch, either above or below the true articular condyle, has been mistaken for "une sorte d'échancrure articulaire, un peu comme dans les poissons."

The specimen of the half-jaw of the Thylacothere examined by M. Valenciennes, like that [the drawing of?] which was transmitted to Cuvier, presents the inner surface to the observer, and exhibits both the orifice of the dental canal and the symphysis in a perfect state. The foramen in the fossil is situated relatively more forward than in the recent Opossum and Dasyure, or in the Placental Insectivora, but has the same place as in the marsupial genus *Hypsiprymnus*. The symphysis is long and narrow, and is continued forward in the same line with the gently convex inferior margin of the jaw, which thus tapers gradually to a pointed anterior extremity,

* Comptes Rendus, 1838; Second Semestre, No. 11, Sept. 10, p. 527 *et seq.*

precisely as in the jaws of the Marsupial Insectivora. In the relative length of the symphysis, its form and position, the jaw of the Thylacotherium precisely corresponds with that of the Didelphys.

In addition, however, to these proofs of the mammiferous nature of the Stonesfield remains, and in part of their having belonged to Marsupialia, Mr. Owen stated that the jaws exhibit a character hitherto unnoticed by the able anatomists who have written respecting them, but which, if co-existent with a convex condyle, would serve to prove the marsupial nature of a fossil, though all the teeth were wanting.

In recent marsupials the angle of the jaw is elongated and bent inwards in the form of a process, varying in shape and development in different genera. In looking, therefore, directly upon the inferior margin of the marsupial jaw, we see in place of the edge of a vertical plate of bone, a more or less flattened triangular surface or plate of bone extended between the external ridge and the internal process or inflected angle. In the Opossum this process is triangular and trihedral, and directed inwards with the point slightly curved upwards and extended backwards, in which direction it is more produced in the small than in the large species of Didelphys.

Now, if the process from the angle of the jaw in the Stonesfield fossil had been simply continued backwards, it would have resembled the jaw of an ordinary placental carnivorous or insectivorous mammal; but in both specimens of Thylacotherium, the half-jaws of which exhibit their inner or mesial surfaces, this process presents a fractured outline, evidently proving that when entire it must have been produced inwards or mesially, as in the Opossum.

Mr. Owen then described in great detail the structure of the teeth, and showed, in reply to M. de Blainville's second objection, that they are not confluent with the jaw, but are separated from it at their base by a layer of matter of a distinct colour from the teeth or the jaw, but evidently of the same nature as the matrix; and secondly, that the teeth cannot be considered as presenting an uniform compressed tricuspid structure, and being all of one kind, as M. de Blainville states, but must be divided into two series as regards their composition. Five if not six of the posterior teeth are quinque-cuspidate and are *molares veri*; some of the *molares spurii* are tricuspid and some bicuspid, as in the Opossums. An interesting result of this examination is the observation that the five cusps of the tuberculate molares are not arranged, as had been supposed, in the same line, but in two pairs placed transversely to the axis of the jaw, with the fifth cusp anterior, exactly as in the Didelphys, and totally different

from the structure of the molares in any of the Phocæ, to which these very small Mammalia have been compared: and in reference to this comparison, Mr. Owen again calls attention to the value of the character of the process continued from the angle of the jaw, in the fossils, as strongly contradistinguishing them from the Phocidæ, in none of the species of which is the angle of the jaw so produced. The Thylacotherium differs from the genus Didelphys in the greater number of its molars, and from every ferine quadruped known at the time when Cuvier formed his opinion respecting the nature of the fossil. This difference in the number of the molar teeth, which Cuvier urged as evidence of the generic distinction of the Stonesfield mammiferous fossils, has since been regarded as one of the proofs of their Saurian nature; but the exceptions by excess to the number seven, assigned by M. de Blainville to the molar teeth in each ramus of the lower jaw of the insectivorous Mammalia, are well established, and have been long known. The insectivorous Chrysochlore, in the order Feræ, has eight molars in each ramus of the lower jaw; the insectivorous Armadillos have not fewer; and in one subgenus (Priodon) there are more than twenty molar teeth on each side of the lower jaw. The dental formulæ of the carnivorous Cetacea, again, demonstrate the fallacy of the argument against the mammiferous character of the Thylacotherium founded upon the number of its molar teeth. From the occurrence of the above exceptions in recent placental Mammalia, the example of a like excess in the number of molar teeth in the marsupial fossil ought rather to have led to the expectation of the discovery of a similar case among existing marsupials, and such an addition to our zoological catalogues has, in fact, been recently made. In the Australian quadruped described by Mr. Waterhouse under the name of Myrmecobius an approximation towards the dentition of the Thylacotherium is exemplified, not only in the number of the molar teeth, which is nine on each side of the lower jaw in the Myrmecobius, but also in their relative size, structure, and disposition. Lastly, with respect to the dentition, Mr. Owen says it must be obvious to all who inspect the fossil and compare it with the jaw of a small Didelphys, that contrary to the assertion of M. de Blainville, the teeth and their fangs are arranged with as much regularity in the one as in the other, and that no argument of the Saurian nature of the fossil can be founded on this part of its structure.

With respect to M. de Blainville's assertion that the jaw is compound, Mr. Owen stated, that the indication of this structure near the lower margin of the jaw of the Thylacotherium is not a true suture, but a vascular groove similar to that which characterizes

the lower jaw of Didelphys, Opossum, and some of the large species of Sorex.

In a memoir to be brought forward on another occasion, Mr. Owen intends to describe the other genus found at Stonesfield, and for which, on account of its marsupial affinities, he proposes the name of *Phascolotherium*.

ZOOLOGICAL SOCIETY.

May 22, 1838.—Richard Owen, Esq., in the Chair.

A letter was first read, dated Sierra Leone, February 19, 1838, from F. Strachan, Esq., Corresp. Memb., in which the writer, referring to the Chimpanzee, observes, that only two had been brought over to Freetown during the late rains, both of which he believes to be on their way to England; he also remarks, that there would be no great difficulty in procuring a young *Hippopotamus*, and that it might probably outlive the voyage to England if brought home in a man of war.

Mr. Waterhouse then laid before the Meeting a collection of specimens received from Mr. Cuming, consisting of a considerable number of birds, with skins of *Mammalia*, &c.: among the latter were several new or rare species, including specimens of the genera *Tarsius*, *Galeopithecus*, *Sciurus*, and *Paradoxurus*.

The scientific value of the above donation was much increased by some manuscript notes made by Mr. Cuming upon several of the animals, giving their native names, and information relative to their habits. Of one of these, a species of *Galeopithecus*, Mr. Cuming remarks:—

"The *Caguang* is an inoffensive animal, inhabiting lofty trees in dark woods, and is known to feed upon the leaves of the Nanka or Jack Fruit; it suspends itself from the upper branches of the tree by all its feet, which gives it a large appearance, as it brings them all four together.

"It flies heavily for about a hundred yards on an inclined plane, but readily ascends the trees by its strong claws; it makes a weak noise similar to geese when at rest: when the calls of nature operate on the animal, it erects its tail and membrane up to the back part of the neck, which gives it a most singular appearance. They are easily taken by the natives throwing nets over them, or by cutting down the tree on which they are; and before they can clear themselves of the branches are taken hold of by the hand. I never saw one of them attempt to bite. When the female has young she is very easily taken. They appear much attached to their young, which are always hanging at the breast. Of late years great numbers of them have been taken for the sake of their skins, which meet

with a ready sale at Manilla. They are found on the islands of Bohol and Mindanado."

Another of the specimens was the *Tarsius spectrum* of Geoffroy, of which Mr. Cuming's *memoranda* furnished the following interesting details :—

"The *Malmag* is a small animal living under the roots of trees, particularly the large bamboo of these islands. Its principal food is lizards, which it prefers to all other. When extremely hungry, I have known it to eat shrimps and cock-roaches, and give a great preference to those which are alive. It is very cleanly in its habits, never touches any kind of food that has been partly consumed, and never drinks a second time from the same water. It seldom makes any kind of noise, and when it does emit sound it is a sharp shrill call, and only once. On approaching it in its cage, it fixes its large full eyes upon the party for a length of time, never moving a muscle: on drawing nearer, or putting anything near it, it draws up the muscles of the face similar to a monkey, and shows its beautiful sharp regular set teeth. It laps water like a cat, but very slowly, and eats much for so small an animal. It springs, nearly two feet at a time. It sleeps much by day, is easily tamed, and becomes quite familiar, licking the hands and face, and creeping about your person, and is fond of being caressed. It has an aversion to the light, always retiring to the darkest place. It sits upon its posteriors when it feeds, holding its food by its fore paws; when not hungry, it will ogle the food for a considerable time. A male and female are generally seen together: the natives of these islands make sure of taking the second having secured the first. They are extremely scarce in the island of Bohol, and only found in the woods of Jagna and the island of Mindanado.

"It produces one at a time. I had the good fortune to procure a female without knowing her to be with young: one morning I was agreeably surprised to find she had brought forth. The young appeared to be rather weak, but a perfect resemblance to its parent: the eyes were open and covered with hair; it soon gathered strength, and was constantly sucking betwixt its parent's legs, and so well covered by its mother, that I seldom could see anything of it but its tail: on the second day it began to creep about the cage with apparent strength, and even climb up to the top by the rods of which the cage was composed. Upon persons wishing to see the young one when covered over by the mother, we had to disturb her, upon which the dam would take the young one in its mouth, in the same manner as a cat, and carry it about for some time; several times I saw her when not disturbed trying to get out of the cage, with the young one in her mouth

as before. It continued to live and increase in size for three weeks, when unfortunately some person trod upon the tail of the old one, which was protruded through the cage, a circumstance which caused its death in a few days: the young one died a few hours after, which I put into spirits.

Jagna, Isle of Bohol, August 1837. "H. Cuming."

Among the collection sent by Mr. Cuming to the Society were specimens of two species of Saurian Reptiles, upon which, at the request of the Chairman, Mr. Martin offered some remarks.

The first species to which he adverted was the *Istiurus Amboinensis* of Cuvier: two specimens of this rare reptile, both males, were procured by Mr. Cuming in the Island of Negros. The *Istiurus Amboinensis*, from the circumstance of the male being furnished with an elevated crest or fan, supported by the spinous processes of the base of the tail, in which respect it agrees with the Basilisk, was placed by Daudin in the same genus with this latter reptile, and characterized as the *Basiliscus Amboinensis*, and in this arrangement Daudin was followed by most succeeding writers. So little allied, however, in reality, are these two reptiles (though possibly they may be the representatives of each other in different quarters of the globe), that they belong to two different sections of the *Sauria*, of which one has the Old World, the other the New World, for its range. The Basilisk (*Basiliscus mitratus*, Daud.), with all the American genera of the Iguanian group or *Eunotes* of Dumeril and Bibron, belong to the section of that group termed *Pleurodonta*, distinguished by the situation of the teeth, which rise from a furrow along the internal aspect of each jaw; whereas the *Istiurus*, with all the Old World genera of the Iguanian group, (the genus *Brachylophus*, of which there is only one species, alone excepted,) belong to the section termed *Acrodonta*, distinguished by the teeth being firmly fixed along the very ridge of each jaw, instead of having an insertion in a lateral furrow. Mr. Martin observed, that the presence of the elevated fan at the base of the tail, which occurs only in the males of *Istiurus Amboinensis*, was a circumstance of interest, inasmuch as it involves a structural difference between the osteology of both sexes. In the common Water Newt, the male of which acquires fanlike membranes at a certain season of the year, the membrane is unsupported by an osseous frame-work, and is deciduous, or rather temporary; but in this animal, while the use of such a fan may be in all probability connected with sexual functions, it is a persistent appendage. The locality from which the specimens were derived gives them additional value.

The next species to which Mr. Martin requested the attention of the meeting was a *Varanus* from the Isle of Mindanado, which he regarded as hitherto undescribed.

This *Varanus*, he observed, appeared to be closely allied to *Varanus chlorostigma*, Dum. and Bibr., differing, nevertheless, materially in the character of the scales of the body, and in the distribution of its markings. As in *Varanus chlorostigma* and *Var. bivittatus*, the suborbital scales consist of a crescent of plates, broader than long, encircled by small plates, which latter cover the suborbital margin. The nostrils are rounded, and placed on each side of the muzzle rather nearer the apex than in *Var. chlorostigma*; the teeth are also compressed with sharp edges very minutely dentated; the head is more produced than in *Var. chlorostigma*, being, in this respect more like that of *Var. bivittatus*; and the scales are larger, coarser, and more irregular.

For this new *Varanus*, Mr. Martin proposed the name of *Varanus Cumingi*.

Varanus Cumingi. *Varan. caudâ compressâ, naribus ferè rotundatis et rostri apicem versus positis; lamellis suborbitalibus inæqualibus, septem vel octo ceteris quoad magnitudinem præstantibus latissimis, lineamque semilunarem efficientibus; dentibus compressis, acutis, et delicatè serratis; corpore suprà nigro, guttis ocellisque flavis ornato; abdomine aurantiaco.*

Hab. apud Insulam Mindanado.

MISCELLANEOUS.

ON THE GENUS *SYNGNATHUS*.

A translation of Prof. Fries' paper on the genus *Syngnathus* having appeared in this Journal, we should not be doing justice to that gentleman, were we to omit publishing the following correspondence which has taken place between him and Prof. Wiegmann with reference to a note by the latter, which will be found at p. 100. vol. ii. of the Annals.—Edit.

"To Prof. Wiegmann.—In the third part of your Journal (Archiv für Naturgeschichte) you endeavour to weaken my statement that 'the specimen which served for the original of Bloch's figure was *S. æquoreus*,' by the assertion that 'the only specimen in Bloch's collection is my *S. Ophidion*.' I am very sorry that you did not take the trouble to compare Bloch's specimen with the figure, for you would certainly have come to a contrary conclusion. I have never seen Bloch's specimen, yet I still maintain that a *S. Ophidion* never served for the original of the figure, because no *S. Ophidion* offers such proportions as those presented by the figure. In no true *S. Ophidion* can the caudal fin be placed in such relation to the anus; the figure

indicates exactly the proportions which we find in *S. æquoreus*, for no *S. Ophidion* can become so large or thick, or have any such snout. This may appear but a trifle, and in one respect it is so; but on the other hand, it is of very great importance for the clearing up of the synonomy and all the errors which have thence originated. You will oblige me by correcting this as soon as possible."—J. B. Fries. Stockholm, 21st August.

Note by Prof. Wiegmann.

"At the same time that I fulfil the wish of my respected correspondent, I must state that I certainly did not compare Bloch's figure, whose work I had not at hand, erroneously supposing that the only specimen in his collection had also been figured by him. Hence it seems that Bloch did not distinguish both species."

ON THE INFLUENCE OF NATIVE MAGNESIA ON THE GERMINATION, VEGETATION, AND FRUCTIFICATION OF VEGETABLES. BY ANGELO ABBENE.

Among the various causes which produce barrenness in lands, has been enumerated the presence of magnesia, because it had been observed that the various magnesian soils are sterile. This opinion has begun to lose credit, since Bergmann, who examined the composition of fertile soils, considered magnesia as forming one of their principal constituents.

Prof. Giobert has performed a number of experiments to inquire into the action of native magnesia, which is found in numerous cultivated soils. In the environs of Castellamonte and of Baldissero, this substance is abundantly diffused in the soils cultivated with great success, and which exhibit a vigorous vegetation. There are many districts in Piedmont and elsewhere, where the bi-carbonate of lime and of magnesia is abundant in the cultivated lands, which produce beautiful plants. Giobert concluded from these experiments; 1st, that native carbonated magnesia is not injurious to the various functions of vegetables; 2nd, that on account of the solubility of magnesia in an excess of carbonic acid this earth can exercise an action analogous to that of lime; 3rd, that a magnesian soil may become fertile when the necessary manure is employed.

From these facts naturally proceeds the conclusion, that if the magnesia was dissolved in an excess of carbonic acid and water, and had entered like the lime into the composition of the sap, it ought to be found in the plants with the potash, lime, oxide of iron, &c. M. Abbene has ascertained this by the analysis of the ashes of plants which had grown in magnesiferous mixtures. Moreover, he endeavoured to find, by comparative experiments, whether the in-

fluence of magnesia on vegetation is analogous to that of lime. The following are the conclusions he arrives at: 1st, Native magnesia is not only not injurious to germination, vegetation, and fructification of plants, but on the contrary, appears to be favourable to these functions. 2nd, Magnesia, being soluble in an excess of carbonic acid, has on vegetation an action analogous to that of lime; and when a soil contains magnesia not sufficiently carbonated, this defect may be remedied by the addition of manure, which by its decomposition furnishes the necessary quantity of carbonic acid; the amelioration will be much more efficacious if the soil be frequently disturbed, as then the air will better exercise its action. 3rd, When lime and magnesia exist in arable lands, the former is absorbed in preference by the plants on account of its greater affinity for carbonic acid. 4th, In barren magnesian lands, it is not to the magnesia that the sterility must be attributed, but to the cohesive state of their parts, to the want of manure, of clay, or of other composts, to the large quantity of oxide of iron, &c. 5th, Barren magnesian soils may be rendered fertile by means of calcariferous substances, as rubbish, chalk, ashes, marl, &c., provided the other conditions be fulfilled.—*Journal de Pharmacie* de Janvier, 1839.

METEOROLOGICAL OBSERVATIONS FOR JANUARY, 1839.

Chiswick.—Jan. 1. Overcast. 2, 3. Cloudy and fine. 4. Rain: clear. 5. Clear and very fine. 6. Overcast: sleet: rain at night, with wind increasing to a hurricane. 7. Boisterous. 8. Clear: slight snow. 9, 10. Frosty. 11. Overcast: rain. 12. Very fine. 13. Cloudy and windy, with slight showers. 14. Rain. 15. Very clear. 16. Fine, but cold. 17, 18. Sharp frost: clear. 19. Stormy and wet: clear at night, with aurora borealis. 20. Fine: rain. 21. Rain. 22. Clear and cold. 23. Overcast and fine. 24. Hazy: fine. 25. Fine. 26. Fine: slight snow. 27. Cloudy and cold. 28. Frosty: slight snow at night. 29. Clear: snow. 30. Sharp frost: slightly overcast: stormy with snow: tempestuous at night. 31. Snowing.

Boston.—Jan. 1. Cloudy. 2. Stormy. 3. Fine: stormy night. 4. Cloudy: rain early A.M. 5. Fine. 6. Fine: snow P.M. 7. Stormy: blew a hurricane all day. 8. Stormy. 9, 10. Fine. 11. Cloudy: rain early A.M.: rain A.M. 12, 13. Cloudy. 14. Fine. 15. Stormy. 16, 17. Fine. 18. Fine: snow P.M. 19. Clondy: rain early A.M.: rain P.M. 20. Cloudy: rain early A.M. 21. Rain. 22. Fine: snow early A.M. 23, 24. Cloudy. 25. Fine: rain P.M. 26. Cloudy: snow early A.M.: snow P.M. 27. Cloudy: rain A.M. 28. Cloudy. 29. Fine: rain and snow P.M. 30. Fine: rain P.M. 31. Cloudy: large fall of snow early A.M.: more snow in the day, with hail.

Applegarth Manse, Dumfries-shire.—Jan. 1. High wind and sharp showers. 2. Generally clear: occasional showers. 3. Very boisterous. 4. Calmed a little: stormy P.M. 5. Wind strong: snow. 6. Frost and snow: rain P.M. 7. Fearful storm: rain and sleet. 8. More calm: more snow. 9. Frost: snow lying three inches. 10. Thaw: snow melting. 11. Rain moderate: flood. 12. Moderate day: sunshine. 13. Frequent heavy showers. 14. Showery: aurora borealis. 15. Frosty after a boisterous night. 16. Clear frost: wind lulled. 17. Calm and frosty, and sunny. 18. Frost A.M.: rain at night. 19. Temperate: heavy flood. 20. Shower A.M.: still mild. 21. Frost A.M.: increasing P.M. 22. Clear frost: overcast P.M. 23. Frost again: slight thaw P.M. 24. Thaw: a few drops of rain. 25. Fine day, without frost. 26. Fine frosty day. 27. Calm and clear frost. 28. Frost: slight fall of snow. 29. Frost: storm of snow. 30. Frost: snow and high wind. 31. Frost: still snowing: nine inches deep.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. ROBERTON ; *by* Mr. THOMPSON *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. VEALL *at Boston, and by* Mr. DUNBAR *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1839. Jan.	Barometer.						Thermometer.									Wind.				Rain.				Dew-point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc. Self-register.			Chiswick.			Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc. 9 a.m.	Chiswick 1 p.m.	Bost.	Dum-fries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	8½ p.m.	Fahr. 9 a.m.	Max.	Min.	Max.	Min.		9a.m.	9p.m										
1.	30·342	30·391	30·081	29·80	30·00	29·87	40·8	41·4	36·2	50	43	43	44	42		S.	W.	W.	WSW.	...	...	...	...	35
2.	30·050	30·102	30·074	29·52	29·96	29·95	45·4	49·3	40·8	49	42	42	36	36½		W.	W.	NW.	wbys.	...	...	...	...	38
3.	29·944	29·958	29·672	29·41	29·70	29·25	45·3	46·2	44·2	49	40	41·5	44½	45		SW.	SW.	calm	W.	...	·04	...	...	40
4.	29·530	29·773	29·548	29·	29·24	29·43	42·0	47·2	41·9	47	31	43	37	35		S.	W.	calm	wbyN	·050	·01	·06	...	41
5.	29·682	29·795	29·641	29·42	29·41	29·30	38·4	44·5	35·6	44	32	34	34	32½		S.	SW.	W.	SW.	...	...	...	1·16	36
6.	29·718	29·735	29·147	29·30	29·55	28·99	35·7	39·0	34·2	53	32	31	20	34		S.	SSE.	calm	SW.	·027	·33	...	...	31
☾ 7.	29·072	29·343	29·096	28·42	28·26	29·00	44·4	50·3	35·0	47	32	45	38	35		S.	W.	W.	WNW.	·227	·10	...	...	37
8.	29·538	29·592	29·526	29·	29·30	29·40	34·7	46·3	34·8	35	31	34	28	29½		W.	W.	N.	WNW.	·047	...	...	...	32
9.	29·716	30·210	29·735	29·36	29·78	30·10	34·2	39·8	33·6	36	21	27	20	22		NW.	NW.	W.	N.	...	...	...	...	31
10.	30·274	30·304	30·250	29·88	30·08	29·94	32·8	35·8	29·3	44	31	28	34	41		S.	S.	calm	S.	...	...	...	...	30
11.	30·150	30·181	30·130	29·60	29·80	29·90	42·4	43·2	32·6	50	42	44·5	43½	42		S.	SW.	SW.	SW.	·027	·06	·20	...	35
12.	30·180	30·232	30·202	29·70	30·09	30·03	47·7	50·0	42·0	51	39	43	40	38		NNW.	W.	calm	SW.	·044	...	·07	0·80	41
13.	30·020	30·049	29·994	29·45	29·69	29·80	49·8	50·3	42·7	52	41	50	46	41		SW var.	W.	W.	W.	...	·01	...	...	41
14.	29·968	29·970	29·781	29·42	29·75	29·63	44·9	51·8	43·2	46	34	41	39	34		SW.	W.	calm	SW.	...	·09	...	...	42
● 15.	29·818	30·033	29·850	29·27	29·68	29·95	36·6	47·7	36·0	44	31	36	36	33½		W.	NW.	W.	NNW.	·127	...	...	...	35
16.	29·944	30·024	29·951	29·55	30·00	30·06	35·3	43·2	33·0	41	26	30	32	29		W.	NW.	calm	NW.	...	...	...	...	32
17.	30·012	30·170	30·045	29·65	30·16	30·20	30·7	40·6	30·6	38	23	29·5	28	29		WNW.	NW.	NW.	NNW.	...	...	...	...	28
18.	30·172	30·204	30·074	29·80	30·19	29·80	29·7	38·0	29·5	44	27	27	21	37		W.	NW.	NW.	NNW.	...	...	...	...	29
19.	29·572	29·949	29·392	29·10	29·39	29·68	42·9	44·0	29·7	50	29	43·5	37	39		SE.	SW.	SW.	N.	...	·13	·08	...	35
20.	30·008	30·038	29·729	29·55	29·82	29·71	38·6	47·8	35·0	51	39	39	37	39		SW.	SW.	calm	SW.	·177	·16	·09	...	33
21.	29·658	29·877	29·677	29·80	29·75	30·03	48·7	49·4	38·2	50	32	40	34	40		SW.	W.	calm	NE.	175	·34	·50	...	38
☽ 22.	30·090	30·445	30·112	29·73	30·34	30·58	34·7	49·2	33·7	37	33	32	32½	32		N.	N.	calm	NE.	·333	...	·05	0·48	33
23.	30·530	30·551	30·494	30·15	30·60	30·55	36·2	37·4	34·6	42	30	34	29	36		NW.	NW.	N.	SW.	...	...	...	...	33
24.	30·532	30·573	30·308	30·12	30·53	30·40	36·2	40·4	33·7	48	37	36	40	40		SW.	NW.	calm	NW.	...	...	...	...	32
25.	30·088	30·108	29·989	29·65	30·13	30·20	43·0	43·8	36·2	49	32	43	39	38½		W var.	NW.	W.	NW.	...	...	...	...	37
26.	30·156	30·388	30·178	29·87	30·50	30·60	35·3	47·3	34·4	38	30	35	33	32		N.	NE.	calm	NE.	...	...	·05	...	32
27.	30·340	30·374	30·246	30·05	30·58	30·42	33·3	37·5	31·2	35	26	36·5	31	26		NE.	NE.	calm	N.	...	...	...	...	28
28.	30·006	30·064	29·682	29·73	30·03	29·74	32·7	35·6	31·6	36	29	32	27	30		NW.	NE.	calm	NW.	...	...	·07	...	29
○ 29.	29·548	29·591	29·155	29·22	29·50	29·29	33·2	37·3	31·6	39	17	29	27	22		W.	NW.	calm	SW.	...	...	...	...	28
30.	29·226	29·284	29·039	28·92	29·23	29·30	27·7	36·0	23·7	34	27	24	26	25		SW.	NW.	NW.	NW.	·194	...	·04	...	23
31.	29·150	29·729	29·141	28·83	29·58	29·97	30·5	32·3	25·5	37	22	29	31	30		W.	W.	NW.	N.	...	...	·19	...	23
Mean.	29·904	30·033	29·804	29·49	29·790	30·450	38·2	43·3	34·7	43·74	31·64	36·1	33·6	34·7						Sum. 1·428	1·27	1·40	2·44	Mean. 33·5

ANNALS OF NATURAL HISTORY.

VII.—*On a new Species of Bat found in the County of Durham, and preserved in the Museum belonging to the Durham University.* By the Rev. LEONARD JENYNS, M.A., F.L.S., &c.

[With a Plate.]

DURING a visit at Durham last autumn, I noticed in the Museum attached to the University of that town a *White Bat*, which I at first supposed to be merely an accidental variety of one of our common species. On a closer inspection I perceived that it could not be referred to any species I was acquainted with; and on making application to Mr. Fox, the well-known naturalist of that place, who was accompanying me at the time, I was kindly entrusted by that gentleman with the loan of the specimen, to enable me on my return home to submit it to a more rigorous examination. This I have accordingly done; and I have little hesitation in pronouncing it to be distinct from all the bats which have been hitherto met with in this country, and as far as my knowledge goes, from all those described by continental authors. There is no ground for supposing that its white colour is otherwise than accidental; but it possesses other characters, those especially derived from the form of the tragus, of sufficient importance, I think, to mark its peculiarity.

I learnt upon inquiry, that this bat had been obtained some time preceding in the church of Auckland St. Andrew, which place is about twelve miles S.W. of Durham. It is now stuffed, on which account it is not possible to take some of the measurements with as much accuracy as could be wished. But the parts are well displayed; and the exact form of the auricle and tragus in particular may be correctly traced.

I propose to designate this bat by the name of *Vespertilio ædilis*. And the following may serve as its specific character;

—to which I shall annex a more detailed description, and a table of dimensions.

V. auriculis ovatis, marginibus externis sinuatis, caput longitudine æquantibus; trago dimidio breviore, margine interno recto, externo subarcuato ante apicem emarginato: patagio interfemorali subtus punctis, hic illic sparsis, setigeris.

In the form of the head and in its general physiognomy, this bat resembles the *V. mystacinus* more than any other of our British species. The *snout* is short, but moderately attenuated, and slightly emarginate at the tip between the nostrils. The *forehead* appears elevated from the erect fur on that part. The *face* and upper part of the muzzle are hairy. There is some indication of a *moustache* on the upper lip, with longer hairs interspersed: there are also a few long hairs on the chin. The *ears* are about the length of the head*, widely separate, oval, obtuse at the extremity, bending outwards: their inner margin convex, and folded back near the base; the outer margin with a moderately deep sinus about half-way down, but immediately beneath the sinus expanding into a rounded lobe. On the whole the auricle very much resembles that of the *V. mystacinus* and *V. emarginatus*, but it is not so deeply notched. The *tragus* is of a very peculiar form, and unlike that of any other species. It is not quite half the length of the auricle, if this last be measured in front; but rather more than half if measured behind: its greatest breadth is not quite one third of its own length: the inner margin is perfectly straight; the outer one arcuate, with a small but rather deep notch a little below the tip which is rounded; there is a somewhat similar notch at bottom, and beneath it a projecting lobe, but these last may also be observed, though not so distinctly, in *V. mystacinus*:—were it not for the upper notch and rounded apex, the form of the tragus would be nearly that of a small segment of a circle, the broadest part being in the middle. The *flying and interfemoral membranes* are naked and moderately ample; the latter without any transverse ciliated lines, but dotted irregularly on the under surface with some minute white glands, from each of which

* Perhaps a little shorter; but the specimen being stuffed, the exact length of the *head* cannot be determined.

proceed one or more small bristles: there are also a few minute scattered bristles along the margin. The *tail* is a little shorter than the fore arm, and the tip appears to project a little from the membrane, but owing to the dried state of the skin, this last point cannot be accurately determined. The *feet* are large, (much larger than in either *V. mystacinus* or *V. Pipistrellus*): the toes long and bristly. The *thumb* is longer than in either of the two species just mentioned. The *fur* is thick and woolly about the head, advancing a little on to the ears externally at the base; on the other parts of the body of moderate length. Its *colour* (in this specimen) everywhere of a beautiful silvery white: the membranes are also white, but of a less pure tint.

Dimensions.

	Inc.	Lin.	
Length of the head and body	2	0	
——— of the tail	1	3	
——— of the ear (*behind*)	0	4½	
——— of the ear (*in front*)	0	6	
——— of the tragus	0	2½	
Breadth of the ear	0	3	perhaps more.
——— of the tragus (*in the middle of its length*)	0	0¾	
Length of the arm	0	7	
——— of the fore arm	1	4½	
——— of the thumb	0	3	
Extent of the flying membrane	10*		

I have compared this bat closely with specimens of most of our British species, with which it can possibly be confounded. It may be of use to point out the leading differences in each case.

From *V. Nattereri* it may be at once distinguished by its smaller ears and shorter tragus, independently of other characters. From *V. Pipistrellus*, by its larger size altogether, sharper snout, longer fore arm and thumb, longer and more slender tragus. From *V. mystacinus*, by its somewhat superior size and greater amplitude of wing; by the ears not being so deeply notched, and the tragus not subulate, but of the form already described; larger feet; want of transverse lines on the interfemoral membrane, &c. From *V. Daubentonii*,

* Not less; but from the way in which the membranes are dried, this measurement cannot be made with accuracy.

(which species it approaches most nearly, especially in size and general proportions,) by its sharper snout, its peculiarly formed tragus, and the absence of ciliated lines beneath the interfemoral.

Of the *V. emarginatus* I possess no specimen for comparison. But it differs from Geoffroy's description and figure of that species*, in the ears being smaller as well as less deeply notched on their external margins, and in the tragus not being subulate, as before stated. The flying membrane also is not quite so ample. But on the whole the proportions are not very dissimilar.

It may still be inquired how far the above distinguishing characters may be trusted as indicating a specific difference. This however, is a question, to which, in the present state of the science, no certain reply can be made. It is in general hazardous to establish new species from single specimens. But in no instance hitherto, have I ever seen any appreciable variation in the form of the tragus, which is the great peculiarity in the one now described. And whether I am right or not in assigning so high an importance to this character, I conceive it will be of equal advantage to science to have brought it under the notice of the naturalist. It is only by tracing every variation of form, with a view to ascertaining the real value of characters, that we can arrive ultimately at a true knowledge of the value of species. If the one here described be a mere variety, it would seem to be a variety of the *V. Daubentonii*, to which on the whole it makes the nearest approach.

I have only to add, that this bat will shortly be returned to the Museum at Durham, where it may be seen by those naturalists who may have an opportunity of visiting that collection; and I beg to express my acknowledgements to Mr. Fox for permission to examine it.

REFERENCE TO THE PLATE.

Plate III. fig. 1. is a dorsal view of *V. ædilis*.—Fig. 2. is a front view of the head enlarged.

Swaffham Bulbeck, Feb. 2, 1839.

* Ann. du Mus. tom. viii. p. 198. pl. 46.

VIII.—*Of the Pith of Plants.* By the Rev. Patrick Keith, F.L.S.

The pith, as every body knows, is that soft and spongy substance which occupies the centre of the vegetable column, in which it is inclosed as in a sheath. In some plants it is close and compact, as in the willow; in others it is loose and interrupted, as in the walnut; in some its diameter is large in proportion to that of the trunk, as in the fig and elder; in others it is very small, as in the oak and elm. Much has been said concerning its functions, and many opinions have been hazarded.

But the only points of view in which I mean to regard it at present are, *first*, the extent to which it may be said to occupy the centre of the plant; and *secondly*, that of its diminution or obliteration in aged subjects.

1st. Does the pith occupy the root or any part of the root, as well as the stem and branches? Before we proceed further, it will be well to circumscribe the limits of the terms root and stem.—"That part of the axis which forces its way downwards, constantly avoiding light, and withdrawing from the influence of the air, is the descending axis or root; and that which seeks the light, always striving to expose itself to the air, and expanding itself to the utmost extent of its nature to the solar rays, is the ascending axis or stem." Such is the definition of Dr. Lindley (Introd. 45.) with which we rest content.

Now though it seems to have been the opinion of the earlier botanists that a pith is present in the root of all plants as well as in the stem; yet M. Dutrochet, ('Recher. Anat.' p. 13.) with some other modern botanists, deny its existence in the root of exogens altogether.

With a view to satisfy myself on this point I began in 1836 to look out for subjects of inspection. I cannot say that I met with anything that could be fairly called a pith in the roots of full-grown or aged trees. I thought I had perceived a pith in the root of a plant of *Berberis communis*, which I inspected many years before the period above stated, with a different object in view; but as it was merely a matter of recollection, I

laid no stress upon it, but proceeded in pursuit of a pith to examine the roots as well as stems, not of aged trees, but of young seedlings.

Accordingly, on the 24th of June 1836, I took up a seedling of the sycamore, *Acer Pseudoplatanus*. The stem measured about *three inches* in height. It was still furnished with its seed leaves, which were elevated about *two inches* above the level of the soil, with a pair of terminal stem leaves two inches in length by one and a half in breadth, and with a second and immature pair protruding from their axils. On a horizontal section it exhibited a circular layer of bark and a circular layer of woody fibre, enclosing a central pith conformable to the terms of the definition as it regards the ascending axis, or stem, which on being partly cut and partly broken asunder, exhibited also spirals both above and below the seed leaves. On the same day I took up a seedling of the beech tree, *Fagus sylvaticus*. The seed leaves were still attached to it and were fully expanded; and the stem on the horizontal section was divisible into bark and bundles of woody fibre, together with a central pith and spirals.

All this is what was to be expected; and the next thing remaining to be done was the inspection of the roots of the said seedlings which was now undertaken. In the above specimens this root measured from two to three inches in length, with a good many lateral fibres, and on a horizontal section exhibited, like the stem, a bark, a circular layer of woody fibre, but without spirals, and a central or axial mass, which mass differed in nothing visible from the central mass of the stem, whether as relative to its colour or to its spongy and cellular texture. On this account I have no hesitation in pronouncing it to be a true and legitimate pith, though lodged in the descending axis. If it be said, that owing to the elevation of the seed leaves in the above cases, the place of the collum must have been rendered doubtful, and that of the commencement of the real root uncertain, then I will present a case from which doubt is altogether excluded.

On the 15th of July, 1836, I stumbled on a seedling of *Corylus Avellana*. I took it up with much care and found that the seed lobes and half of the investing shell were still attached

to it. The stem measured seven inches in length, with three or four leaves. The root measured three or four inches in length, with many lateral fibres; and the diameter of the plant, at the widest, was about one eighth of an inch. In taking a longitudinal section of a portion of the root and stem so as to pass through the *collum*, which could not be mistaken, as the lobes never rise above the level of the soil, it was evident that the pith, strictly cellular and under the aspect of a fine thread, descended into the root, without any node or interruption or breach of continuity whatever, and without any appreciable difference beyond that of colour. Above the *collum* it was of a deep red; below it was of a pale green. If any doubt remains in the mind of the reader as to the accuracy of this statement, I shall be very glad if he will have the goodness to repeat the experiment on a seedling of the same species and of the same age, and to say what he thinks of it then. With regard to myself, I hold it to be a most satisfactory proof of the existence of a pith in the descending axis even of exogens. It may be seen equally well in the root of seedlings of the oak and ash, but without the peculiarity of the red and green colours.

2ndly. The other debateable point on the subject of the pith is as follows:

Does the pith, after having reached its maximum of diameter and parted with its specific juices, ever shrink further in its dimensions, whether by the generation of longitudinal fibres within it, or by pressure from without, or by any other cause? In the earlier days of botanical inquiry, it was the opinion of phytologists that the pith is obliterated with age, or at least much diminished in its diameter. This opinion was advocated by Mirbel in his 'Physiologie Végétale*, where he not only states the fact, but explains how, in his opinion, the change is effected,—that is, by being converted, first, into longitudinal tubes and then into wood. But on the contrary, there are botanists who contend that "the pith undergoes no change after the end of the first year of its growth;" at which period it may be said to have become distinctly cellular, and

* Liv. III.

altogether, or nearly, dry. They add, that the fact of the great discrepancy of dimension between the pith of the primary shoot of the elder and that of the shoots of after years, so often quoted as an evidence of the shrinking of the pith, is an argument founded altogether in error, as the pith of the primary shoot from seed never was more than a mere thread*. Yet the question is not whether the pith of the shoot of future years does ever shrink to the diminutive size of the shoot of the first year from seed; but, rather, whether the pith of any shoot, be it primary or be it secondary, does ever shrink in any sensible or perceptible degree after the end of a year's growth, when its juices, as it seems, may be said to be exhausted. On the 1st of June, 1836, I separated from the stool of an ash-stock a stem of three years growth. It measured about nine feet in height, the growth of each year being distinctly marked, and measuring each about three feet in length. The upper shoot, that is the shoot of 1835, had a diameter of $\frac{3}{8}$ths of an inch, with a pith of $\frac{1}{4}$th at the widest. The middle shoot, that is the shoot of 1834, had a diameter of $\frac{7}{12}$ths of an inch, with a pith of $\frac{1}{6}$th; and the lower shoot, that is the shoot of 1833, had a diameter of $\frac{7}{8}$ths of an inch, with a pith of $\frac{1}{10}$th. Now as the shoots of the several years were equally luxuriant, and the youngest a year old, the pith ought, by hypothesis, to have been of the same dimensions in all of them. Yet it was gradually smaller and smaller from the youngest to the oldest; though it was undoubtedly of equal diameter in the first year's growth of each. For the shoot of a single year, from a different stock, gave a diameter of pith equal to that of the upper shoot of the above stem; and poles of twelve years old gave still a diminishing diameter when inspected towards the base. Whence we infer that the pith keeps shrinking, from one cause or other, long after the period of the first year's growth.

Since the above was written, it seems that several botanists of eminence have expressed themselves with regard to the preceding facts, in a way that seems to amount, either to a total denial of them, or to a persuasion that they are of too

* Lind. Introd. 60, 213.

little importance to merit any particular consideration, or at the least, that they are not new,—maintaining that wherever pith occurs, it occurs as an adjunct of stem and not of root. But with all due deference to great names and to great men, I contend most zealously for the fact of the existence of a pith in the root of exogenous seedlings at least. The affirmation of it is good, at any rate, as far as my induction goes; and no one is at liberty to deny it, unless he can show that he has examined roots of the same species and of the same age, without having been able to discover the same appearances. Nor is any one at liberty to say that the pith which is found in the root is of no importance because it occurs merely in seedlings and disappears in the mature plant. As well might the zoologist deny the importance of the tail of the tadpole, because it disappears in the full-grown frog. And if it is said that my facts are not new, I can only answer for myself, by saying in reply, that I never either heard or read of such facts till I discovered them in the course of my own investigations. They may be old facts; but if facts at all, whether old or new, why are they contradicted by modern botanists?

I contend also with equal zeal for the fact of the gradual diminution of the pith of the stem till it dwindles away at last to a mere thread in the mature trunk; and as I am persuaded that the facts which I have adduced in support of the doctrine are new, so I am satisfied that they are also true. Yet truth does not always meet with the ready reception which it merits—not even from philosophers themselves; especially when any new fact occurs that happens to militate against their recorded opinions.

IX.—*Remarks on some Species of the Genus* Syngnathus.

By William Yarrell, Esq., F.L.S., F.Z.S.

When reading in November last in the 8th Number of the 'Annals of Natural History' the translation of the paper on the species of the genus *Syngnathus* by M. B. Fr. Fries of Stockholm, in which that gentleman states that the first example of the ophidial pipe-fish figured in the 'History of the

British Fishes,' vol. ii. p. 335, under the name of *S. æquoreus*, is the female; and that the second example, figured at p. 338, under the name of *S. Ophidion*, is the male of the same species, I was at once induced to suppose that M. Fries was under some misapprehension on the subject, from the following circumstances; first, because as far as my own observation went, *S. æquoreus* was, in this country at least, a very rare species. Montagu says that he obtained but two examples. At the time of printing the account of that species in the 'British Fishes,' I possessed, as there stated, but two examples; while on the coast of Dorsetshire, where I have frequently fished for *Syngnathi*, I could obtain any number of that which I had called *S. Ophidion*, and it is equally common elsewhere. This extraordinary disparity of numbers appeared to be strong ground, but not the only ground, for supposing them distinct as to species.

When in 1834 I first exhibited at the meetings of the Zoological Society dissected specimens of males and females of three species of the genus *Syngnathus*, in order to show the peculiarities both of the marsupial and ophidial pipe-fish, I had no difficulty in finding among my specimens females of *S. Ophidion* of Bloch, and I insert here a paragraph from the Report of the Proceedings of the Zoological Society for Oct. 28, 1834, which follows a notice of the exhibition of preparations of males and females of *Syngnathus Acus* and *Typhle*. "Specimens of males and females of *S. Ophidion*, Bloch, were also exhibited. In this species neither male nor female possesses an anal pouch, but the *ova* are carried by the male in hemispheric depressions on the external surface of the *abdomen*, anterior to the *anus*. All the specimens examined having these external depressions proved to be males, with the *testes* in the abdomen very obvious: those without external depressions proved to be all females, internally provided with two lobes of enlarged *ova*."

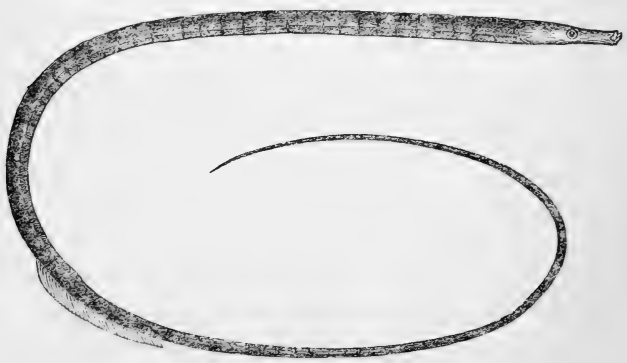
In reference to the recent observations of M. Fries I purposely deferred any new examination of the various specimens I possessed till Mr. Jenyns's visit to London in the early part of the present month, when we made the inspection together. I may here observe, that at the Meeting of the British Asso-

ciation at Newcastle last autumn, Mr. Wallace, of the Isle of Man, gave me two specimens of *S. æquoreus*; I therefore now possessed four examples of this rare fish, all dried, and all apparently females, there being no appearance of the hemispheric depressions which usually distinguish the males. On carefully opening these four we found that two of them were males and two females, and contrary to M. Fries's experience, the males, in this instance, were the two largest of the four. Supposing the disappearance of the hemispheric cells in the dried males of the ophidial pipe-fish to be the consequence of desiccation, I tried the experiment of drying a male specimen of *S. Ophidion*, Bloch, which, when taken out of diluted spirit of wine, bore the usual half circular depressions, and I found that these depressions became less conspicuous in three or four hours, and were lost in the sculpture of the abdominal plates when the specimen became quite dry.

The best specific distinction between *S. æquoreus*, Linn. and *S. Ophidion*, Bloch, as it has been generally called, appears to be in the situation of the anal aperture, which marks the division between the body and tail in fishes. In the largest male of *S. æquoreus*, measured on this occasion, the body was $9\frac{3}{4}$ inches, the tail $10\frac{1}{2}$; in the second, the body was $9\frac{1}{4}$ inches, the tail $9\frac{1}{2}$. In the largest male specimen of *S. Ophidion* that was measured, the body was 6 inches, the tail 8 inches; in another the body was 4 inches, the tail 6. I admit that there is considerable resemblance in the form and sculpture of the plates, but in this country *S. æquoreus* is as rare as the *S. Ophidion* of Bloch is common: males and females of both exist, as has been shown, and I have not yet met with any specimens, which by forming an intermediate series, would bring these two fishes together. I have hitherto referred to this second ophidial pipe-fish by the name of *S. Ophidion*, although M. Fries is, I believe, perfectly correct in stating that the *Ophidion* of Jenyns and Yarrell, identical with the *Ophidion* of Bloch, tab. 91. figure 3. as quoted by both in their synonyms, is not the true *Ophidion* of Artedi and Linnæus; but let us inquire a little further. In this country we are in the habit of referring to the works of Swedish naturalists, considering them good authorities for the Linnæan species.

When engaged on the synonyms of the *Syngnathi*, I referred to the works of Swedish authors, and found that M. Retz, in his 'Fauna Suecica,' at page 312, refers to Bloch's figure 3. tab. 91. as representing the *Ophidion* of Artedi and Linnæus. Again, M. Nilsson in his 'Prodromus Ichthyologiæ Scandinavicæ,' page 67. also refers to Bloch's figure 3. tab. 91. as the *Ophidion* of Linnæus*. If therefore we have erred in quoting Bloch's figure as the true *Ophidion*, we have at least gone astray in good company; the more so, since Lacepède in his original work,—the editor of the recent edition,—and Baron Cuvier himself in his 'Règne Animal,' have quoted Bloch's figure 3. tab. 91. as the *S. Ophidion* of Linnæus.

As short descriptions, without figures, have often led to an erroneous adoption of names, I send herewith a representation engraved on wood of the true *S. Ophidion* of Artedi and Linnæus. I have found it occasionally on the southern coast of England, but it is not very common. It is described by M. Fries in the 8th Number of the 'Annals,' page 103. and by Mr. Jenyns in his 'Manual of British Vertebrate Animals,' page 488.



The straight-nosed Pipe-fish. Nat. size.

The species which has hitherto been called *S. Ophidion* by Mr. Jenyns and myself will in future be considered as *S. an-*

* M. Fries, when quoting the synonyms of three Swedish authors, namely, Retz, Ekström, and Nilsson, for the true *Ophidion* of Linnæus, very quietly omits the references made by two of them, M. Retz and Nilsson, to the figure of the *Ophidion* of Bloch.

guineus: a name first suggested for it by Mr. Jenyns in his 'Catalogue of British Vertebrate Animals,' and referred to as a synonym for the fourth species of *Syngnathus* in his 'Manual of the British Vertebrate Animals,' page 487.

The British *Syngnathi*, as suggested by Mr. Jenyns, consist of 6 species: 2 marsupial pipe-fish, *S. Acus* and *S. Typhle*, having true caudal fins; 4 ophidial pipe-fish, which may be again divided into 2 sections, the first of which contains 2 species, *S. æquoreus* and *S. anguineus*, having each a rudimentary caudal fin; the second section also containing 2 species, *S. Ophidion* and *S. lumbriciformis*, in which there is no rudimentary caudal fin, the round tail ending in a fine point.

In the recent works on British Fishes, one by Mr. Jenyns the other by myself, we had considered the figure of Bloch's *Ophidion* as representing the true *Ophidion* of Linnæus, which as here admitted is not the case: Mr. Jenyns has described the true *Ophidion* under the name of *lumbriciformis*, and I inserted the true *lumbriciformis* but omitted the true *Ophidion* altogether. I acknowledge with pleasure my obligations to M. Fries for setting me right.

Ryder Street, Feb. 18, 1839.

X.—*Descriptions of some new or rare Indian Plants.* By G. A. W. Arnott, Esq., LL.D.

[Continued from p. 23.]

Balsamodendron, Kunth (*Burseraceæ*).

In the 'Prodromus Floræ Peninsulæ Indiæ Orientalis', i. p. 176, Dr. Wight and I united this as a subgenus to *Protium*, and it still appears to me doubtful if the two be separated by sufficiently important characters: the habit is, however, very different. In consequence of the addition of several new species, the character given by Dr. Wight and me, will require to be slightly altered, as follows:

Calyx late vel tubuloso-campanulatus: torus disciformis in fundo calycis ovarium cingens, externe inter singula stamina verrucula elevata instructus: stamina octo: drupa ovata: nux obtusa angulata.

From this it is obvious that the shape of the calyx and nut

is not sufficient to distinguish *Balsamodendron* from the species we referred to the *Protium* of Burmann, and that the principal character consists in the position of the torus or disc.

All the East Indian species which I have seen have the calyx tubular-campanulate as in the Senegambia one (*Heudelotia*) and *Commiphora* of Jacquin, while it is broad and shallow in *B. gileadense*, and perhaps in the other two from Arabia: but, as these last are not sufficiently known, I cannot avail myself of that probable difference of structure to sub-divide the genus into sections. The following is a synopsis of all the species known:

1. *B. Berryi* (Arn.); spinescens, foliis longiuscule petiolatis glabris, foliolis 3 cuneato-obovatis crenatis, terminali lateralibus duplo majore, pedicellis unifloris brevibus, petalis calyce breviter tubuloso subduplo longioribus, fructu apiculato.—Protium gileadense. *Wight et Arn. Prod.* i. p. 177 (excl. syn.). *Wight, Cat.* n. 543.—Amyris Gileadensis. *Roxb. Fl. Ind.* ii. p. 246 (excl. syn.).

This was introduced to the Botanic Garden of Calcutta, by Dr. Berry, of Madras, so that in all probability the plants were obtained from the interior of the Peninsula, where it is a native; and not from Arabia, as Roxburgh supposed.

2. *B. Roxburghii* (Arn.); spinescens, foliis petiolatis glabris, foliolis 3, terminali ovali serrulato, lateralibus minutis, pedicellis unifloris brevibus.—Amyris commiphora. *Roxb. Fl. Ind.* ii. p, 244.—A. Agallocha. *Roxb.*? *Herb. Beng.* p. 28.—Commiphora madagascariensis. *Jacq. H. Schoenbr.* ii. t. 249 (fide Roxb.).

Hab. in Silhet, Assam, &c.

There can I think be little doubt of *Commiphora* being the same with the present genus, but I feel less certain that *C. madagascariensis* is the species described by Roxburgh. My principal objection arises from the distance between the localities where the two are said to be indigenous. As, however, no succeeding botanist appears to have received it from Madagascar, Jacquin may have been accidentally led into an error on that point.

3. *B. Wightii* (Arn.); spinescens, foliis sessilibus glabris, foliolis 3 subæqualibus cuneato-obovatis acute dentato-serratis, flori-

bus sessilibus fasciculatis, fructu subiter acuminato. *Wight, Cat.* n. 2426.

Hab. ad Bellary, *Wight* (1834).

4. *B. Africanum* (Arn.); spinescens, foliis longiuscule petiolatis pubescentibus, foliolis cuneato-obovalibus subrugosis obtuse inciso-serratis, terminali majore, floribus fasciculatis subsessilibus, petalis calyce tubuloso parum longioribus, drupa ovoidea acuminata.—Heudelotia africana. *Guillem. et Pierott, Fl. Senegamb.* i. p. 150. t. 39.
5. *B. Kafal* (Kunth); spinescens, foliolis 3, ovalibus dentato-serratis, junioribus villosis, senioribus glabris, drupa compressa mammillata. *DC. Prod.* ii. p. 76.
6. *B. Kataf* (Kunth); inerme, foliolis 3, ovalibus plus minusve acuminatis serratis glabris, pedunculis dichotomis.—Amyris Kataf. *Forsk. Descr.* p. 80.
7. *B. gileadense* (Kunth); inerme, foliis petiolatis glabris, foliolis 3 integerrimis obovato-oblongis, pedicellis brevibus unifloris, calyce latiuscule campanulato. B. gileadense *et* B. opobalsamum. *Kunth. DC. Prod.* p. 76.—Amyris gileadensis *et* A. opobalsamum, *Linn.*

Vahl, at the end of the second part of his 'Symb. Bot.' has shown that *A. opobalsamum* was described by Linnæus, not from specimens, but from a bad figure, and that it is not distinct from *A. gileadensis.* What *Balsamea meccanensis,* Gled., in 'Act. Soc. Nat. Cur. Ber.' iii. p. 127. t. 3. f. 2., may be, I have no means of determining. DeCandolle refers it as a variety with bipinnate leaves to the present species; but if it belongs to this genus, that structure must have arisen either from accident or cultivation, and in neither case can be considered as a permanent form.

Brown has about twenty years ago shown that the Linnæan genus *Exacum* ought to be limited to the East Indian species which have all showy flowers; it is therefore somewhat strange, that in almost all the European Floras, those of Britain not excepted, that name is given to small slender filiform plants, with an appearance quite different from the typical species. To the European species Adanson had long since given the name *Cicendia*; they differ from *Exacum* by the funnel-shaped corolla, the segments of which become twisted after flowering into a kind of calyptra above the capsule,

and by the one-celled or at most imperfectly two-celled capsule. The Asiatic genus, of which I am about to define several species, may be thus shortly distinguished from the other genera of the *Gentianeæ*.

Exacum, L.

Sepale dorso carinato alata. Corolla rotata absque corona, circa capsulam marcescens: æstivatio dextrorsum contorta. Glandulæ epipetalæ vel hypogynæ nullæ. Stamina 4—5: antheræ immutatæ porro dehiscentes. Ovarium complete biloculare. Stylus filiformis plus minusve adscendens. Stigma indivisum. Capsula valvulis introflexis complete bilocularis, placentis demum utrinque liberis.

The following is a *Clavis Analytica* of all the species I have seen:

Caules subsimplices, corymbi nudiusculi.

- Stamina 4 ..... *E. tetragonum*, R.
- Stamina 5.
  - Folia ovalia acuta vix acuminata, corollæ laciniæ ovali-oblongæ acutæ... } *E. macranthum*, Arn.
  - Folia lanceolata utrinque attenuata subundulata, corollæ laciniæ obovales obtusiusculæ ..... } *E. ceylanicum*, L.

Caules valde ramosi.

- Stamina 5: inflorescentia foliosa.
  - Caules ramique late 4-alati: capsula globoso-ellipsoidea: flores magni ..... } *E. Wightianum*, Arn.
  - Caules ramique 4-goni vix alati: flores parvuli.
    - Folia oblongo-lanceolata acuminata: cor. laciniæ obovatæ; capsula ovata oblonga ..... } *E. courtallense*, Arn.
    - Folia ovata acuta: cor. laciniæ oblongo-lanceolatæ: capsula oblongo-ellipsoidea ..... } *E. Walkeri*, Arn.
- Stamina 4: inflorescentia nudiuscula: capsula globosa: flores parvi..... } *E. pedunculatum*, L.

These may be more perfectly defined as follows:

1. *E. tetragonum* (Roxb.) caulibus subsimplicibus basi 4-alatis sursum 4-angulatis, foliis ovalibus vel oblongo-lanceolatis sessilibus, corymbo nudiusculo, corollæ laciniis 4 oblongis acutis, pedunculis fructiferis rectiusculis.

Hab. ad oras Malabaricas.

Flores mediocres.

2. *E. macranthum* (Arn.) caulibus subsimplicibus teretiusculis, foliis subpetiolatis ovalibus acutis vix acuminatis, corymbo nudi-

usculo, corollæ laciniis 5 ovali-oblongis acutis, pedicellis fructiferis rectiusculis.

Hab. in montibus insulæ Ceylani.

Flores magni.

3. *E. ceylanicum* (Linn.); caulibus subsimplicibus tetragonis, foliis lanceolatis longe acuminatis basi in pseudo-petiolum attenuatis margine subundulatis, corymbo nudiusculo, corollæ laciniis 5 obovalibus obtusiusculis, pedicellis fructiferis subrecurvis.—E. ceylanicum. *Wall. Cat.* n. 4357, *b.*

Hab. Prope Colombo in insula Ceylano.

Flores magni.

4. *E. Wightianum* (Arn.); caulibus valde ramosis ramisque late alatis, foliis oblongo-lanceolatis acuminatis subsessilibus, corymbo folioso, corollæ laciniis 5 ovalibus acutis vel acuminatis, pedicellis fructiferis valde recurvis, capsula globoso-ellipsoidea.—E. ceylanicum. *Wall. Cat.* n. 4357, *a.* (et forsan *c.*).

Hab. in Peninsulæ Indicæ montibus australioribus.

Flores magni. Capsula latitudine vix longior.

5. *E. courtallense* (Arn.); caule dichotome ramoso, ramis angustissime 4-alatis, foliis oblongo-lanceolatis acuminatis, inflorescentia foliosa, corollæ laciniis 5 obovalibus obtusiusculis, pedicellis fructiferis rectiusculis, capsula ovato-oblonga.

Hab. ad Courtallum in Peninsula Ind. Or.

Flores subparvi. Capsula versus basin quam apicem latior.

6. *E. Walkeri* (Arn.); caule dichotome ramoso, ramis angustissime 4-alatis, foliis ovatis acutis vel acuminatis, inflorescentia foliosa, corollæ laciniis 5 oblongo-lanceolatis, pedicellis fructiferis rectiusculis vel leniter arcuatis, capsula oblongo-ellipsoidea.

Hab. in insulæ Ceylani montibus.

Flores subparvi. Capsula revere ellipsoidea, $1\frac{1}{2}$—2-plo longior quam lata.

7. *E. pedunculare* (Linn.); caule erecto ramoso tetragono, foliis lanceolatis, corymbis nudiusculis, corollæ laciniis 4 ovalibus, capsula globosa.—E. pedunculare. *Wall. Cat.* n. 4359.—E. carinatum, *Roxb.*—E. sulcatum, *Roxb.*

Hab. in insula Ceylano, et per omnem fere Hindoostaniam.

Flores parvi.

In addition to these Roxburgh mentions an *E. bicolor*, and Wallich *E. teres*, *stylosum*, *pteranthum*, and *E. grandiflorum*, the last from the Peninsula (and perhaps the same as *E. Wightianum*), with none of which I am acquainted.

This genus occurs principally in the south-west parts of India: it does not appear to be found in Java.

Loranthus, L. (*Loranthaceæ*).

L. lageniferus (Wight); corolla longe tubulosa æqualiter 5-fida, antheris erectis, involucro campanulato magno colorato circa flores paucos subcapitatos. *Wight, Cat.* n. 2437. *Hook. Ic. Pl.* t. 229, 230.

Hab. in Malabaria; *Wight.*

Lignosus glaber parasiticus. Folia opposita petiolata, petiolo 2—4 lineas longo, ovato-lanceolata seu elliptico-oblonga, obtusa basi rotundata, plurinervia, crassa, coriacea. Pedunculi fasciculati ad ramos annotinos orti, brevissimi, apice involucrum sanguineum gamophyllum campanulatum magnum 4—5 lobum ferentes. Flores 4—5 in fundo involucri subsessiles. Calycis limbus cupularis membranaceus repando-5-dentatus. Corolla pulverula tubulosa, involucrum duplo superans, apice supra medium quinquefida, versus laciniarum basin per æstivationem inflatim annulata, laciniis linearibus demum reflexis. Antheræ erectæ.

Sin *Involucratos* DeCandollei, seu *Lepeostegeres* Blumii, bracteis quandoque coalitis gaudere posse putes, tum hæc nova ac pulcherrima species cum iis collocari debet: sin non, ad novam finitimamque inter *Symphyanthos* subsectionem pertinebit facillime diagnosi supra data limitatam.

This is perhaps the most beautiful of the genus: its blood-red involucres are about an inch long and 4 to 6 lines across.

Polycarpæa, Lam. (*Paronychiaceæ*).

1. *P. corymbosa* (Lam.); suffruticosa vel herbacea, caulibus plerumque albo-tomentosis, foliis ex oblongo-lanceolatis in linearia vel etiam setacea fasciculatis, floribus cymose-corymbosis, sepalis scariosis lanceolatis acuminatis enerviis, petala subovalia obtusa capsulamque 2—3-plo superantibus.—*α*, radice simplici unicauli, caule simplici vel ramis elongatis erectis simpliciusculis. —P. corymbosa, *Lam. Wight, Cat.* n. 1172.—*β*, caulibus dichotome ramosis, rarius (et tunc e radice lignoso multicipiti pluribus) simpliciusculis.—P. spadicea, *Lam. Wight et Arn. Prod. Fl. Penins. Ind. Or.* i. p. 357.—*a*, foliis oblongo-lanceolatis obtusiusculis, corymbis densissimis. *Wight, Cat.* n. 1168.—*b*, foliis approximatis oblongo-linearibus, stipulas vix superantibus, corymbis densis. *Wight, Cat.* n. 1169.—*c*, foliis linearibus subu-

latisve plus minusve distantibus, corymbis laxiusculis, ramulis albo-tomentosis, sepalis albis. *Wight, Cat.* n. 1170.—*d,* caulibus ramulisque dense albo-tomentosis, foliis subulatis subdistantibus, corymbis laxiusculis, sepalis aurantiaceis.—P. aurea, *Wight, Cat.* n. 2443.—*e,* ramulis tenuibus glabriusculis, foliis setaceis subulatisve, corymbis laxis gracilibus. *Wight, Cat.* n. 1171.

In compliance with Dr. Wight's lately expressed wishes, I now unite *P. corymbosa* and *P. spadicea* of authors, and certainly he has had most ample opportunities of examining them in all situations and under various appearances. At the same time there is in general a peculiar habit about *P. corymbosa,* by which it can be distinguished from all forms of the other species: this, however, cannot so easily be expressed in words. In *P. corymbosa* the root is always simple, and apparently either annual or biennial: it is occasionally so in *P. spadicea*; but what is the case? the stems are dichotomously branched, which they seem never to be in the other species. Again, in *P. spadicea* the plant is usually, perhaps always, if not removed, suffruticose, while I have seen no tendency to that in *P. corymbosa.* The broad-leaved specimens, which Dr. Wight and I referred to *P. spadicea,* appeared at first sight to have simple stems; but there are numerous fascicles of leaves and rudimentary branches in the axils of the leaves, so that these stems must be considered as the primary ones, or axes, of a branched form. The proportions of the petals and sepals are nearly the same in all the varieties.

2. *P. diffusa* (Wight); suffruticosa ramosissima laxa diffusa glabriuscula, foliis fasciculatis linearibus, floribus cymoso-corymbosis, sepalis scariosis ovato-lanceolatis acuminatis enerviis, petalis sepala subæquantibus, stamina capsulamque acutam parum superantibus. *Wight, Cat.* n. 2442.

Hab. Prope Tuticoreen (Maio 1835), *Wight.*

3. *P. spicata* (Wight); glabra, radice ad collum multicipiti, caulibus plurimis gracilibus diffusis foliorum pedunculorumque fasciculos distantes 1—2 gerentibus, foliis radicalibus caulinisque fasciculatis glaucis subcarnosis spathulato-oblongis acutiusculis, floribus imbricatis spicatis, spicis paucis ad pedunculi apicem fasciculatis, sepalis scariosis dorso uninerviis, petala

subulata multo superantibus, filamentis basi dilatatis uno cum corollæ basi in annulum circa capsulam coalitis. *Wight, Cat.* n. 2441.

Hab. in montibus Peninsulæ australioribus, *Wight.*

[To be continued.]

XI.—*Observations on the Tortoise or Shield Beetles, commonly denominated* Cassida *by Linnæus, with the Characters of Six New Genera.* By the Rev. F. W. Hope, F.R.S., F.L.S., F.Z.S., and Member of various Foreign Societies.

[With a Plate.]

Of late years, amongst Coleopterous Insects, the *Adephaga* have engaged much of the attention of entomologists, probably because they stand foremost in the artificial arrangement of modern authors; there are however some remarkable exceptions to the contrary, such as the *Curculionidæ* now in progress of publication by the illustrious Schönherr, the *Cetoniadæ* and *Buprestidæ* by Gory and Percheron, and also the *Heteromera* by Solier. Other groups, however, have been comparatively neglected, and particularly the *Cassidoidea*. I purpose therefore in the present paper to examine the group, and suggest the adoption of some new genera, to be classed under the family of *Cassidæ*, so named by Dr. Leach. *Cassida* of Linnæus is very rich in species. It presents us with singularly grotesque and varied forms, and if we look more particularly to the larvæ, no less remarkable will they be found in their earlier stages than in their complete development. The larvæ sometimes assume the appearance of vegetation, some imitating in that state the squamæ of the fir cones, others again the filamentous appearance of plants and lichens. The entire group which I term *Cassidoidea* is composed of several families and is confined to no particular country. Several of the forms which predominate in the New World have not their counterpart in the Old World, at least as far as we know at present. The European species with their larvæ and habits have been ably described by Rœsel Reaumur, DeGeer, and others. Our indigenous British species early attracted the attention of my friend the Rev. Wm. Kirby, three of which, with their

transformations, are described in the third volume of the Linnæan Transactions. The whole group appears to be entirely herbivorous in its habits. In our own country they are chiefly partial to thistles and marsh marigolds, occurring also on the water-mint and other aquatic plants. The thistle, when much infested by the larvæ early in the summer, occasionally appears as if scorched by fire; the marsh marigolds turn perfectly black, and in some years, when attacked by these parasites, they are not only greatly impoverished by them, but are entirely destroyed. The number of European tortoise beetles known is about forty species. It is difficult however to state the numbers accurately, as great difference of opinion exists as to what are really species; their synonymy is perplexing, and, as the range which some species enjoy is very extensive, there is consequently an increase of varieties, arising probably from difference of food, climate, temperature, and soil. Instead of entering accurately into their geographical distribution, I shall merely state the numbers mentioned by authors, and then add some general remarks on the whole. Linnæus, in his 'Systema Naturæ,' gives us but 23 species, Olivier 105, Fabricius, after separating *Imatidium*, 119. The Baron De Jean, including the latter genus, gives us in the first Catalogue 109, and in his last about 400. In my own collection there are 500 species, and at least 200 more have fallen under my notice; and as *Cassida* is a group which has been greatly neglected, it will eventually be found much more numerous than is at present supposed. Out of the 500 now known, 400 belong to the New World. Perhaps scarcely 40 will be found mentioned in catalogues and works as inhabiting Africa, and less is the number described from Asia, even including the extended continent of Australia. Professor Perty, in his 'Conspectus Coleopterorum Indiæ Orientalis,' mentions but 22 from Asia. From the above statement, therefore, it will appear that the New World affords a very large proportion of the *Cassidoidea* known. As to the European species, there is not much reason to think that they will prove to be much more numerous than at present. As to African *Cassidæ*, they will eventually be found to be considerably more numerous than the European species, and I am inclined to think that

those of Asia will far outnumber those of Africa. In both of the last-mentioned continents, large tracts of diversified country are unexplored, and till we become better acquainted with their entomology, it may seem like presumption to attempt to express an opinion respecting them. At the end of this paper will be found references to the different authors who have written on the *Cassidoidea* of the chief divisions of our globe; I shall therefore refer the entomologist for further information to the species described by them, and conclude these observations with a remark on the peculiar colouring matter of some of these beetles which are called tortoise or shield beetles.

Little, very little is known, respecting the substance composing the elytra of insects, and what has been written respecting chitine or elytrine does not appear to be applicable to several of the *Cassidæ*: I allude more particularly to the brilliant metallic splendour of those diaphanous species allied to *Cassida nobilis*, Linnæus, which are frequently ornamented with greenish-gold and sulphury-silver coloured spots and fasciæ, the colours of which disappear when the insects are dead, but may be made to reappear by immersing them in hot water. I am inclined to think that the colouring matter, alluded to in the above insects, is not to be found in the elytra, but is derived from the intestines. I do not here attempt to explain the cause, but merely record an impression, which may be erroneous; it is with a hope indeed of inducing others to investigate a cause very imperfectly understood, that this suggestion is now thrown out.

CASSIDA, Linnæus.

Cassida, *Leach*. Cassidoidea, *Hope*.

The first genus which I propose to separate from the multiplicity of forms now arranged under the term *Cassida* is the

Genus *Mesomphalia**. Pl. IV. fig. 1.

Type of the genus *Cassida gibbosa* of Fabricius.

Forma fere orbicularis.

* *Mesomphalia* is derived from μεσομφάλιον, or from μέσος and ὀμφαλὸς, the boss of a shield.

Antennæ 11 articulatæ cylindricæ, articulo 1mo crasso, 2do minimo, reliquis fere æqualibus, extimo apice subconico.
Labrum breve, margine antico valde inciso.
Mandibulæ cochleariformes, apicibus incisis.
Maxillæ breves bilobæ, lobo superiori tenui recto.
Palpi maxillares crassi et cornei, articulo 2do longo, duobus ultimis brevioribus et fere æqualibus.
Mentum parvum corneum antice angustum.
Labium membranaceum subquadratum.
Palpi labiales cornei, articulo 2do longiori, ultimo ovato.
Elytra orbicularia ante medium umbone armata.
Thorax rotundatus emarginatus.
Prosternum sub ore protensum, intra pedes anticos productum et contractum, canaliculatum.

To this genus belong *Cassida* 6-*pustulata*, *lateralis*, *discors*, *inæqualis*, *reticularis*, and *discoidea* of Fabricius, and also *ænea* of Olivier, and at least 60 other species, many of which are unpublished: several of them will be found ably described by my friend Professor Germar of Halle, in his 'Species Insectorum,' a work not sufficiently appreciated in this country; it was published in 1824 at Halle in Saxony.

*Dolichotoma**, Hope. Pl. IV. fig. 2.

Type of the Genus, *Cassida Chloris*, Hope.

Antennæ, 11 articulatæ, articulis sex basalibus glabris, reliquis villosis, 1mo crasso, 2do minimo, quatuor sequentibus parvis et æqualibus, reliquis multo longioribus.
Mandibulæ parvæ quadratæ, extus tuberculo corniformi armatæ.
Maxillæ minutæ subcoriaceæ, lobis duobus rotundatis.
Palpi maxillares minuti, articulis subæqualibus, extimo conico.
Mentum parvum coriaceum. *Labium* subtrigonum setosum.
Palpi labiales minuti, articulis subæqualibus, ultimo ovato-conico.
Elytra orbicularia, ante medium angulato-elevata.
Thorax antice rotundatus, lateribus in dentem acutum productis.
Prosternum inter pedes anticos latius, subplanum.

* From δολιχός et τομή.

D. Chloris, Hope, long. 7 lin., lat. 7 lin. Totum corpus supra viride, thorace utrinque acute-angulato, convexo, impunctato; elytris in medio disci angulato-nodosis, subrugosis, lateribus externis glabris; corpus subtus atrum, elytris infra subcyaneis, pedibus nigris plantisque ferrugineis.

Habitat in Insula Sancti Vincentii.

This *Cassida* I obtained by purchase from the valuable collection of the Rev. Lansdown Guilding. To this genus belong *Cassida strigata* of Schuppell, and *luctuosa* of Olivier and others.

*Selenis**, Hope. Pl. IV. fig. 3.

Type of the Genus, *Cassida perforata* of Fabricius.

Antennæ articulis compressis extrorsum crassioribus, 1^mo^ crasso, 2^do^ minimo, 3^tio^ longo gracili, 4^to^ breviori, 5^to^ et reliquis longitudine decrescentibus, et gradatim crassioribus, extimo apice acuto.

Mandibulæ corneæ multidentatæ.

Maxillæ simplices, lobis rotundatis.

Palpi maxillares 1^mo^ minimo, 2^do^ longissimo curvato, apice latiori, 3^tio^ et extimo æqualibus, ultimo apice conico.

Mentum parvum subquadratum.

Labium parvum trigonum et setosum.

Palpi labiales 1^mo^ articulo brevi, 2^do^ elongato, 3^tio^ subsecuriformi.

Elytra semicircularia ante medium angulato elevata, humeralibus angulis acute porrectis, apice elytrorum acuminato.

Thorax trigonus utrinque in spinam acutam productus.

S. perforata I make the type of the genus. It appears doubtful after examining many specimens of the above insects if the perforations are not the result of accident; no two specimens accord; the holes under a lens seem irregularly worn, the effect may be caused simply by attrition; it may be remarked also that the elytra of the same insect differ considerably; the only published species besides the type is *C. Spinifex*, Fab., which is considered only as a sexual distinction. There are, however, in our English cabinets others which are undescribed.

* *Selenis*, from the Greek Σελήνις, signifying a crescent.

*Tauroma**, Hope. Pl. IV. fig. 4.

Type of the Genus, *Cassida Taurus* of Fabricius.

Antennæ articulo 1^mo^ crasso, 2^do^ minimo, quatuor sequentibus longioribus æqualibus, metallicis, quatuor proximis longioribus æqualibus villosis, extimo majori ovato-conico.

Mandibulæ latæ cochleariformes, apice edentulæ.

Labrum breve corneum, in medio acute emarginatum.

Maxillæ minutæ bilobæ et ciliatæ.

Palpi maxillares perbreves, articulo 7^mo^ minimo, duobus proximis æqualibus, ultimo conico-ovato.

Mentum transversum, angulis anticis rotundatis.

Labium breve conicum et pilosum.

Lingua magna et membranacea.

Palpi labiales maxillaribus longitudine æquales, articulo 1^mo^ brevi, duobus aliis longitudine æqualibus, at ultimo ovato-conico.

Elytra angulis anticis utrinque in spinam crassam truncatam porrectis, angulis posticis rotundatis dorso haud tuberculato.

Thoraæ antice rotundatus valde emarginatus.

Prosternum latum planum.

To the above genus belong *C. bicornis*, Fab., one of the most splendid of the *Cassidoidea*. Monsieur Chevrolat has named a third species as inhabiting Mexico: as I am doubtful however of its having been described and published, I am unwilling to mention manuscript or catalogue names; a fourth I now describe from my cabinet.

Tauroma punctipennis, Hope. Long. 5 lin., lat. 3½ lin. Atro-viridis elytris fortissime punctatis, dorso convexo cornubus humeralibus crassis et truncatis. Corpus subtus atro-cyaneum, pedibus concoloribus plantisque ferrugineis.

Habitat in Brasilia in Museo nostro.

Desmonota†, Hope. Pl. IV. fig. 5.

Type of the Genus, *Cassida Platynota* of Germar.

Antennæ articulo 1^mo^ crasso, 2^do^ minimo, octo sequentibus fere æqualibus subdepressis, extimo ovato.

* Derived from ταῦρος and ὦμος, *humerus*.

† From δεσμὸς and νῶτος, *tergum*, notted back.

Mandibulæ crassæ corneæ, apice truncato, dentibus duobus externis majoribus.
Labrum corneum medio marginis antice emarginato.
Maxillæ membranaceæ bilobæ, lobo externo parvo et coriaceo.
Palpi maxillares breves, 1mo minuto, 2do et 3tio subtrigonis, extimo ovato-acuto.
Mentum transversum.
Labium parvum trigonum setosum.
Lingua maxima et membranacea.
Palpi labiales maxillaribus æquales, 1mo brevi, duobus aliis longitudine æqualibus, ultimo apice acuto.
Elytra oblongo-quadrata, nodoso-convexa.
Thorax transversus, margine antico fere recto, lateribus obliquis, angulis posticis recte truncatis, margine et postico in medio angulato.
Prosternum latum inter pedes anticos subimpressum.

The name of *platynota* was originally published by Germar, and is therefore retained in preference to that of *nodosa* of De Jean; there are other species belonging to it; some of those in the French collections I regard merely as varieties. The species of this division require a very accurate examination; none of my acquaintance accord altogether with the above generic characters, they require therefore further subdivision; the typical insect is from the Brazils.

*Batonota**, Hope. Pl. IV. fig. 6.

Type of the Genus, *Cassida bidens* of Fabricius.

Antennæ articulo 1mo crasso, quatuor sequentibus æqualibus minutis, sex sequentibus multo longioribus, et fere longitudine æqualibus, ultimo apice conico.
Mandibulæ subquadratæ apicibus multidentatis.
Maxillæ bilobæ lobo externo coriaceo.
Palpi maxillares articulo 1mo brevi, tribus aliis fere æqualibus et præcedenti multo longioribus et crassioribus.
Mentum transversum.
Labium parvum subrotundatum et ciliatum.
Palpi labiales graciles, articulo 1mo crasso, duobus aliis æqualibus et præcedenti paullo longioribus.

* From *βάτος*, a thorn, and *νῶτος*, back, Thorn-backed *Cassidæ*.

Elytra humeris in lobum maximum angulatum antice porrectis, spina erecta in medio suturæ elongata, acuta.
Thorax antice rotundatus subemarginatus, dorso subcarinato.
Prosternum oblongum subplanum in medio impressum.

To the genus *Batonota* belongs also the *Cassida truncata* of Fabricius from Cayenne, *C. pugionata* of Hoffmansegg and *laticollis*, Mihi, and others, which are undescribed. Those spine-backed species with the humeral angles of the elytra ought to belong to a subgenus, the description of which I leave for future authors.

The above six genera are detached from the genus *Cassida*, and may be ranged under the family *Cassididæ* till the families are more accurately characterized. Those forms have chiefly been selected which differ considerably in their outward appearance, and various others might have been added. If at a future time a similar communication on this group or any other is thought worthy of insertion in the 'Annals of Natural History,' the writer when possessed of more leisure may be induced to accede to the requests of the Editor, as he has on the present occasion.

References to Authors.

Besides consulting the general works of Linnæus, Herbst, Fabricius, Olivier, and Schönherr, for the description of numerous species of *Cassidoidea*, the entomologist is referred to the following authors who have written on the *Cassidæ* of particular countries.

Europe.—Of England I mention Marsham's Coleoptera; Mr. Kirby's Memoir in the Linnæan Transactions, vol. iii.; Stephens's Outlines of Entomology; Curtis's Genera, and the Entomologia Edinensis, by James Wilson.

Of Sweden—I give the names of De Geer, Paykull, and Gyllenhall.

Of France—Reaumur, Latreille, Guerin and Percheron, Dufour, and Baron Walckenaer.

Of Holland—Frisch.

Of Germany—Those of Schrank, Duftschmidt, and Panzer.

North and South America—For the *Cassidæ* of the New World consult the following works:—Say's Writings; Species Insectorum, by Germar; Vigor's in the Zoological Journal;

Delectus Animalium Articulatorum, by Spix and Martius; Voyage de Humboldt et Bonpland, Premier Volume; Kirby's Fauna Boreali-Americana; Coleoptères de Mexique, par Chevrolat (*Omocerus* N. G.); Dalmann's Analecta Entomologica, (*C. fornicata*); Guerin and Percheron, Genres des Insectes, col. plate 12; Sahlberg's Perceuli Entomographici Cassida; Der Naturforscher, Stuck 6 and 9, and Fuessly's Archives.

Africa—Refer to Klug's Bericht on the Coleoptera of Madagascar; Insectorum Enumeratio Eleutheratorum, by Goldfuss. The work of Palisot Beauvois also contains the figures of some species from the kingdom of Oware.

Asia—Consult Brulle's Voyage in the Morea; Hope's New Species in Gray's Zoological Miscellany; Wiedemann's Zoologisches Magazin, 1817—1823; Perty's Synopsis Coleopterorum. Falderman records only a single species, namely, *Cassida bella,* in his Fauna Entomologica Trans-Caucasica. It seems probable that *Cassida* may be greatly swayed by the vegetation on which the different species feed.

New Holland—Bois Duval's Voyage de L'Astrolabe.

REFERENCE TO PLATE IV.

1. *Mesomphalia gibbosa.* 1 *a.* The same in profile; *l* 1. Labrum; *md.* Mandible; *mx.* Maxilla; *l* 2. Labium; *a.* Antenna; *st.* Sternum; *t.* Tarsus; *u.* Unguis.
2. *Dolichotoma Chloris.* 2 *a.* The same in profile; *md.* Mandible seen in two positions; *mx.* Maxilla; *l* 2. Labium; *a.* Antenna.
3. *Selenis perforata.* 3 *a.* The same in profile; *l* 1. Labrum; *md.* Mandible; *mx.* Maxilla; *l* 2. Labium; *a.* Antenna.
4. *Tauroma Taurus.* 4 *a.* The same in profile; *l* 1. Labrum; *md.* Mandible; *mx.* Maxilla; *l* 2. Labium (with the large fleshy internal lingua); *a.* Antenna.
5. *Desmonota platynota.* 5 *a.* The same in profile; *l* 1. Labrum; *md.* Mandible; *mx.* Maxilla; *l* 2. Labium (with the internal lingua); *a.* Antenna.
6. *Batonota bidens.* 6 *a.* The same in profile; *md.* Mandible; *mx.* Maxilla. *l* 2. Labium; *a.* Antenna; *st.* Sternum.

XII.—*Some Observations on the Digestive Apparatus of Infusoria.** By Dr. J. Meyen, Prof. Bot. University of Berlin.

To Richard Taylor, Esq.

Sir,

Excuse the liberty I take of forwarding to you a short memoir on the digestive apparatus of the Infusoria, which I request you will publish in your highly valuable journal. My

* Communicated by the Author to, and translated for this Journal.

paper was sent as early as October to Prof. J. von Müller for insertion in his 'Archiv,' and since then I have seen in your journal that Prof. Rymer Jones has made some correct observations on the same subject, which have been controverted, but unsuccessfully, by Prof. Ehrenberg.

[We gladly comply with the wishes of our learned correspondent, and, in order to lay the whole subject as it at present stands before our readers, we have extracted from the elegant and valuable work of Rymer Jones the passage treating on this subject. We intend also to give in our next number an extract from a memoir which has recently been published by M. Dujardin in the 'Annales des Sciences Naturelles,' which is likewise opposed to the views taken by Dr. Ehrenberg. In the mean time we hope that some of our English naturalists (excellent microscopes being now much in use in this country) will take up this subject and help to bring this interesting question to an issue.—R. T.]

It will be well known to naturalists that Von Gleichen even as early as the year 1781 fed the infusorial animalcules with carmine, and observed on the following day that several red globules were apparent in the interior of their body, whence he drew the inference that the animalcules had swallowed the colouring substance; Gleichen also observed that the coloured globules were expelled by a distinct aperture. Gleichen figures these received red globules very correctly, and indeed each globule in the interior of a distinct circle, without stating anything respecting their design. Subsequently Prof. Ehrenberg repeated these observations, and thence concluded that the true Infusoria possess a larger or smaller number of stomachs, which in one group are destitute of intestinal canal, but in the other are connected with one another by peculiar extremities of the canal, nay sometimes exhibit laterally appended canals *en cul-de-sac*. In consequence of these discoveries the animalcules received the name of Polygastrica. M. Ehrenberg thought he observed that these stomachs are filled in regular succession, and he has even figured, more or less completely, in a number of animalcules of this kind, the intestinal canals

which are said to lie between the globular stomachs and to connect them one with the other.

These views of Dr. Ehrenberg on the digestive apparatus of the Infusoria have already been doubted in various quarters. I have never participated in them; in the first place, because I could never perceive these intestinal canals which are said to connect the various stomachs one with the other; and secondly, because many years ago I had observed in Infusoria of various genera that the supposed stomachs circulated with more or less rapidity in their interior, resembling exactly the rotatory currents of the globules in the cellules of the *Charæ*. Subsequently I frequently saw in *Vorticellæ*, when they had nine to fifteen large balls of indigo in their body, that these revolved constantly round a fixed central point, and thus evidently showed that in this case an intestinal canal connecting the stomachs and in connexion at one extremity with the oral and at the other extremity with the anal aperture could not exist.

What then, however, are those equally sized vesicles and globules which occur in the interior of animalcules and have been regarded as their stomachs? This question will be generally asked of me, and I have also put this question to myself, until by continued observation of this subject I have ascertained the origin of these globules and vesicles. The true Infusoria are vesicular animals, whose cavity is filled with a gelatinous, somewhat slimy substance; the consistence of the membrane forming the vesicle is in some of these creatures distinctly visible, and in several genera I have been able to observe in this membrane a spiral structure plainly recognisable, so that the structure of these Infusoria, in the main, appeared to me to resemble that of the cells of plants. In the larger Infusoria there proceeds from the mouth a cylindrical canal (alimentary canal) obliquely through the membrane which forms the animal; the lower end of this canal expands when it has taken up nutriment in a greater or less degree, generally, however, to the size of the globules which occur in the interior of these Infusoria. The inner surface of this portion of the alimentary canal is beset with cilia, by the motion of which the absorbed substances, both the nutritive sub-

stances and foreign ingredients, are forced round with an exceedingly great velocity, until they are compressed together into the form of a perfect sphere. During this formation of the globules, the stomach (for this organ can only be considered as such) is in free connexion with the alimentary canal, and by the outer ciliary apparatus new substances are continually driven into this canal and into the stomach; but whether the alimentary canal between the oral aperture and the stomach is also clothed with cilia I have not been able to ascertain with certainty. As soon as the globule of the absorbed substances has attained the size of the stomach, it is expelled at the other extremity, and forced into the cavity of the animalcule, immediately on which a new globule is formed within the stomach, if solid substances are present in the surrounding fluid; this second globule is also thrown into the cavity of the animalcule, and now pushes the first globule with the intervening slime further forwards, and thus the formation of similar globules from the absorbed substances is constantly going on. These are the globules from the number of which Dr. Ehrenberg inferred the great quantity of stomachs of these animals. If the surrounding fluid does not contain much solid matter, these globules are also less compact, and they then have the same appearance as we find them in Infusoria in common uncoloured infusions, where such a globule at times only exhibits a few small particles, and consists for the greater part of a slimy substance, with which these are mixed. At times two such globules are pressed in the interior of the body so forcibly together that they remain in this connexion.

If it is desired to observe the formation of these globules very distinctly, the observation should be commenced immediately on the Infusoria coming in contact with the coloured fluid. The reception of the coloured matter takes place very rapidly, frequently even in half a minute, and then it may easily be perceived how one coloured globule after the other passes from the stomach *perfectly formed,* and how in the *Paramæciæ*, *Keroniæ*, and *Vorticellæ* they are propelled downwards at the border of the cavity of the animal, and how then the new globule pushes the preceding one with the intervening slime forwards, so that the first soon ascends on the

inner border of the opposite side, turns round at the opposite end of the cavity, and is then again forced down on the other side; and thus the mass of the globules goes on continually increasing, until again some are expelled at the anus. The quantity of these globules is sometimes so great that the entire cavity of the animalcule is filled with them, and they lie so near to one another that all of them together form as it were a great ball, which frequently, especially in the *Vorticellæ*, revolves slowly round its centre. This rotatory motion is caused, however, as I have perfectly assured myself, by the force with which the globule newly formed in the stomach is propelled into the cavity, and hits against the under border of the existing ball. In other cases on the contrary, when so many globules are not yet present, this circular rotation is also seen, of which I have already made mention at the commencement; but it has not become clear to me by what external causes this motion is here produced.

In the true Infusoria, therefore, the substances which they take up are brought in form of globules into the cavity of the body, and here the nutritive substance is extracted from them; the useless passes off generally in the same globular form in which it entered, but sometimes the intervening slime is reabsorbed, and the particles of the globule already separate in the interior of the body, which, however, does not frequently happen.

But what then are those vesicular cavities which occur frequently in such great number, and also of very different sizes, in the interior of Infusoria? Stomachs they certainly are not; they have nothing to do with the absorbed globules just mentioned, although sometimes those globules penetrate singly into these cavities, which, however, must be regarded only as an accidental occurrence. The origin of these cavities, as also their *sudden and total disappearance* in the slimy substance in the interior of the Infusoria, may be observed with the same ease as the formation of the globules; nay, it is sometimes even possible to observe the formation of such a cavity around one of the absorbed globules, which then after some time again disappears. The microscope shows that these cavities have no distinct membranous sides, but consist in mere excavations of the slimy substance; they also occur

generally near the inner surface of the membrane which forms the coating of the animalcule, and at times some of them increase to a very considerable circumference, so that the cavity of such a bladder constitutes one-third and one-half of the cavity of the entire animalcule. That these cavities contain a thin and aqueous fluid and are not filled with air is shown by the remarkably small refraction of rays at their borders, and in the larger Infusoria it may be quite distinctly seen that they do *not open exteriorly*. Similar cavities are also formed in the mucus of the cells of plants, especially frequent in *Hyphomycetes* growing in water.

My botanical researches prevent my working out this subject more fully; these brief notices may, however, suffice to induce a greater number of naturalists to follow up the observations, which it is true require great patience; for the above-mentioned facts are not to be seen immediately in every animalcule; but they are sufficiently important, for already have the Polygastrica passed into all recent works on zoology.

Prof. Rymer Jones *on the Digestive Apparatus of Infusoria**.

However imposing, from their completeness, the views of Ehrenberg concerning the digestive system of the Polygastrica may be, and sanctioned as they are by almost general consent, we cannot pass over a subject of so much importance without expressing ourselves as being far from admitting their accuracy in all respects, and we must say that our own observations upon the structure of the Polygastrica have led us to very different conclusions.

The positions of the mouth and anal aperture we are well assured, by frequent examination, to be such as are indicated by the illustrious Professor of Berlin; but with regard to the tube named by him intestine, and the stomachs appended thereto, our most patient and long-continued efforts have failed to detect the arrangement depicted in his drawings. In the first place, as regards the function of the sacculi, which he looks upon as the organs in which digestion is accomplished;

* Extracted from Prof. Rymer Jones's work entitled 'A General Outline of the Animal Kingdom.'

in carnivorous animalcules which devour other species we might expect, were these the stomachs, that the prey would at once be conveyed into one or other of these cavities; yet, setting aside the difficulty which must manifestly occur in lodging large animalcules in these microscopic sacs, and having recourse to the result of actual experience, we have never in a single instance seen an animalcule, when swallowed, placed in such a position, but have repeatedly traced the prey into what seemed a cavity excavated in the general parenchyma of the body.

In the second place, the sacculi have no appearance of being pedunculated, and consequently in a certain degree fixed in definite positions: during the last two hours we have been carefully examining some beautiful specimens of *Paramecium aurelia*, an animalcule which, from its size, is peculiarly adapted to the investigation of these vesicles; and so far from their having any appearance of connexion with a central canal, as represented in the figure copied from Ehrenberg, they are in continual circulation, moving slowly upwards along one side of the body, and in the opposite direction down the other, changing moreover their relative positions with each other, and resembling in every respect the coloured granules which have been described as visible in the gelatinous parenchyma of the *Hydra*.

With respect to the central canal, we have not in any instance been able to detect it, or even any portion of the tube seen in the figures, much less the branches represented as leading from it to the vesicles or stomachs, as they are called. Even the circumstances attending the prehension of food would lead us to imagine a different structure; witness for example the changes of form which *Enchelis pupa* undergoes when taking prey, as shown in fig. 16, 3, where it is represented in the act of devouring a large animalcule, almost equal to itself in bulk, and is seen to assume a perfectly different shape as it dilates its mouth to receive the victim, with which its whole body becomes gradually distended. Such a capability of taking in and digesting a prey so disproportionate, would in itself go far to prove that the minute sacculi were not stomachs; as it evidently cannot be in one of these that digestion is accomplished.

XIII.—*Note on the Migration of the Snowy Owl*, Surnia nyctea, *Dum.* By Wm. Thompson, Esq., Vice-President of the Natural History Society of Belfast.

I have the pleasure on this occasion of recording a novel and interesting fact in the history of that beautiful bird, the Snowy Owl. By the ship 'John and Robert' (Captain McKechnie), of 501 tons burden, belonging to the port of Belfast, and which arrived here from Quebec early in the month of December last, three specimens of this bird, which had been caught on board, were brought hither alive. A fourth individual, similarly obtained, died about the time the vessel entered Belfast bay.

These birds were captured either at twilight or when dark, as they perched on the rigging; the sailors observing that they were asleep before attempting to lay hold of them. They were kept on flesh-meat, which, for the first ten days, was forced down their throats, but after this time they fed themselves; in about fifteen days after their capture the vessel came into port. These three birds, of which two are males and the other a female, are very fine examples of the *Surnia nyctea*; a more splendid specimen than the last-mentioned, which died and is now in my possession, I have not seen. All of them I should consider birds of the year, and from the one that died having been described to me as similar to mine, it probably was so likewise*.

Having heard that these were part of a large "flight" of Snowy Owls that were for several days seen about the vessel, I—never having read any account of this species being met with on its migration—made the fullest inquiry into the subject. The captain obligingly replied to all my queries, and besides furnished me with the log-book of the ship.

It may in the first place be desirable to give an extract from the 'log' for a week previous to their occurrence, that we may learn if the state of the wind, &c., will account for the

* See remarks on this subject in the 1st vol. of 'Annals', p. 243. Two of the Snowy Owls there noticed, which have since been kept in a spacious garden containing many fruit trees, never perch upon them, but remain constantly on the ground, although in rainy weather a portion of their snow-white plumage is thereby much soiled, greatly to the disadvantage of their appearance.

great number of these birds observed in the course of their migration. The vessel, which was bound from Quebec to Belfast, was driven by contrary winds along the coast of Labrador.

1838.

Nov. 8. Wind W.N.W. at noon; strong gales and tremendous sea running. N.W. at midnight, and more moderate.

— 9. Wind W. by N. at 10 A.M.; weather hazy. At 5 P.M. strong gale from E.; bore up for the harbour of Labrador; here we lay for the next 48 hours. On the 10th were strong gales from the E. On the 11th strong gales from the S.

— 12. Wind N. by E., moderate; left harbour of Labrador this day; light breezes and clear weather.

— 13. Wind N.; going along shore passed Bellisle.

— 14. Wind E. by N. at noon; light airs; cloudy weather; sun obscure.

— 15. Wind S. by E. at noon; sun obscure; strong gales from the S.

— 16. Wind S.S.W., light airs, clear weather; saw Owls * to the number of about thirty or forty for the first time. Lat. 54·02; long. 47·40; about 250 miles from the straits of Bellisle.

— 17. Wind S.S.W., fresh breezes; a few Owls alighted on masts; two captured this evening about 7 o'clock. Lat. 54·20; long. 46·20; about 375 miles from Bellisle.

— 18. Wind S.W.; strong breeze and heavy sea from the E.; great numbers of Owls, about fifty or sixty, flying about and alighting on the rigging; captured none to-day, nor did any remain on the ship this night. Lat. 54·50; 450 miles from Bellisle.

— 19. Wind N.W., strong breeze and cloudy weather; squally with snow showers during the day; captured two more Owls to-night. Lat. 54·51; long. 37·39; about 635 miles from Bellisle.

— 20. Wind N. by E., heavy gales with a tremendous sea running; saw several owls, but none were caught. Lat. 54·50; long 33·10.

— 21. Wind N.E. at 2 P.M., E. by S. at 4 P.M.; light breezes and cloudy weather; saw a Gannet and Curlew. Lat. 54·25; long. 31·40; about 740 miles from Bellisle.

* Notices of the Owls are added to the 'log', which is otherwise much condensed.

Nov. 22. Wind S.E. by S., light breezes; no Owls seen these two days past, nor were any afterwards met with.

Dec. 4. Vessel arrived at Belfast.

The captain describes the migration of these Owls to have been an extremely beautiful sight, and more particularly, from his never having seen such birds before, was greatly interested about them. Sometimes they kept flying about the vessel without alighting, and again there would be one or two on every yard-arm, with others hovering just above; on alighting, they fell asleep, apparently from exhaustion. Numerous as were these beautiful creatures, it was only when occasional bickerings took place among those which had alighted on the yard-arms, and in the stillness of night, that they were heard during their entire presence. Their flight, described to me as inaudible, could not but call to mind the finest and most poetical description of this characteristic trait applied to the owls generally, "How serenely beautiful their noiseless flight! A flake of snow is not winnowed through the air more softly silent!*" Occasionally they remained for a day about the ship, when but little way was made, and again, as reported to me, "went off for a day and returned next morning," greatly to the surprise of the beholders how they could find the ship after a night had intervened. What must have added much additional interest to their appearance, was the idea entertained, that these birds blown from the coast of Labrador, and finding, like the dove of old, "no rest for the sole of her foot," had, after traversing the pathless waters, sought the vessel for this purpose, loitering about her course, disappearing for a day, and again hastening to repose upon her yards and rigging. But however pleasing such imaginings, it is not for the naturalist here to pause, but in search of TRUTH, assuredly not less attractive, to pursue inquiry further.

If by reason of storms or otherwise he cannot perceive why the same birds should, after having rested on and left the vessel, re-appear another day, he may perhaps conclude, that the Owls thus seen, were bodies successively migrating to more southern latitudes, and that different birds appeared on each occasion, or at all events that it was not the same individuals which presented themselves during the whole period.

* Blackwood's Magazine, vol. xx. (1826) p. 671.

That the chief abode of the Snowy Owl is the regions within the arctic circle, is well known, as it likewise is that numbers migrate thence in winter to Canada and the United States. Reference to the 'log' will show that, during the five days on which these birds were successively observed, the vessel kept nearly to the 54th degree of latitude, having sailed during the time about 500 miles in an easterly direction; consequently, if the course of the Owls were to Canada or the States, the vessel, which in such event might possibly "fall in with" them a second time, was proceeding somewhat in an opposite direction, but whither again it does not appear that they would have been driven by storms. A greater number of birds too being seen on the 18th than on the 16th favours the idea of a continuous migration.

The vessel was about 250 miles from the straits of Bellisle, or the S.E. point of Labrador, when these Owls first appeared, but sailing eastward, was on the day they were last seen about 740 miles distant from them and 480 miles from the southern extremity of Greenland, which for some time was the nearest land.

I shall take this opportunity of again noticing the occurrence of the Snowy Owl in Ireland. In the possession of Edward Waller, Esq., of Dublin, I lately saw a fine specimen, which was shot in the winter, "about three years ago," near Omagh in the county of Tyrone. This individual may probably have migrated thither early in the year 1835, when several others were obtained in different parts of Ireland; and at which period the species was first recorded as visiting the country*. In a letter, dated Twizell House, July 21, 1838, I was informed by P. J. Selby, Esq., that he had received a Snowy Owl from Killibegs, county of Donegal, near which place it was shot in the month of November or December, 1837 †. This is the same individual which appears from the 'First Annual Report of the Natural History Society of Dublin,' p. 6, to have been announced at one of the meetings as an Eagle Owl (*Bubo maximus*); it is almost unnecessary to add the fact, that the gentleman who made the announcement had not the opportunity of seeing the specimen, but judged merely from the description communicated to him.

* See 'Magazine of Zoology and Botany', vol. ii. p. 179.

† In the first volume of the 'Annals' (p. 241) a Snowy Owl is noticed as having been killed near Belfast on the 2nd of December, 1837.

XIV.—*Floræ Insularum Novæ Zelandiæ Precursor; or a Specimen of the Botany of the Islands of New Zealand.* By Allan Cunningham, Esq.

[Continued from p. 31.]

MYRTACEÆ, *R. Br., DC.*

1. Leptospermum, *Forst., Gærtn.*

553. *L. scoparium, Forst. Char. Gen. t.* 36. *DC. Prodr.* iii. *p.* 227. *Willd. Sp. Pl.* 2. *p.* 949. *A. Rich. Fl. Nov. Zel. p.* 337. *Andr. Rep. t.* 622.

Kai-Katea ab incolis vulgo vocatur.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Bay of Islands.—1826, *A. Cunningham.* (Middle Island).—1773, *G. Forster.*

A stunted *tree* flourishing in barren clayey soil, and producing a a very hard red wood, sometimes used by the natives for the corner parts of their larger canoes. The perfume, says the Rev. W. Yate, which the blossoms exhale, is very fragrant.

554. *L. ericoides*, ramulis glabriusculis, foliis linearibus basi sensim angustatis approximatis glabris punctatis ciliatis, calycibus villosiusculis, dentibus acutis persistentibus, caule arboreo. *A. Rich. Fl. Nov. Zel. p.* 338.

Manouêa ab incolis designatur, *D'Urville*, Astrolabe Bay. *Rawiri, R. Cunningham*, Bay of Islands.

New Zealand (Middle Island). Dry barren hills, Astrolabe Bay.—1827, *D'Urville.* (Northern Island.)—1769, *Sir Jos. Banks.* Hills around the Bay of Islands.—1833, *R. Cunningham.*

Arbor mediocris, 12—15 pedalis, ramosissima. *Flores* parvi albi ad apicem ramorum.

2. Metrosideros, *R. Br., DC.*

* *Foliis oppositis.*

555. *M. buxifolia*; scandens, ramulis incano-hirsutis, foliis (4—5 lineas longis) ellipticis ovatisve obtusis coriaceis venosis nitidis margine revolutis, breviter petiolatis utrinque pilis incanis conspersis subtus punctatis, floribus corymbosis terminalibus, pedunculis sæpe trifloris.

Aki, indigenis. *Lignum-Vitæ* of the Missionaries.

New Zealand (Northern Island). A rambling shrub adhering to trees, and by its lateral roots climbing to the summits of the loftiest timber in the forests of Wangaroa, Bay of Islands, &c.—1826, *A. Cunningham.*

Frutex ramosissimus, caule scandente radicante vel fibrillis radiciformibus ad truncos arborum adhærente quemadmodum *Hederæ. Folia* lato-elliptica, ovalia, obtusa. *Flores* parvi, albi, in corymbis ad summa ramulorum dispositi. *Calyx* monosepalus, tubu urceolato pubente limbo 5-dentato, dentibus brevissimis latis obtusis. *Corolla* quinquepetala, petalis sessilibus rotundatis valde concavis deciduis. *Stamina* numerosa, corolla longiora, filamentis glabris, antheris bilocularibus. *Stylus* simplex staminibus paulo longior. *Capsula* parvula, globosa, 3-locularis.

The wood of this plant, which is hard and heavy, takes a most beautiful polish, and its grain seems to be only a continuation of hard knots, which gives it a peculiar but very beautiful appearance when wrought. Yate's New Zealand, p. 47.

556. *M. perforata*; ramosissima ramulis hirtis, foliis ovalibus obtusis coriaceis, aveniis glabriusculis superne nitidis, brevissime petiolatis punctatis, juvenilibus præsertim subtus pilosis, pedunculis axillaribus unifloris apice sæpiusve trifloris. *A. Rich. Fl. Nov. Zel. p.* 334.—Melaleuca perforata, *Forst. Prodr. n.* 212.—Leptospermum perforatum. *Forst. Gen. Char.* 36. *n.* 4.

New Zealand (Middle Island).—1773, *G. Forster.* Astrolabe Harbour. 1827, *D'Urville.*

Arbuscula ramosissima erecta. *Folia* ovalia unguiculata. *Flores* parvuli, albi, axillares, solitarii aut terni. *Calyx* monosepalus adhærens; tubo turbinato pilosiusculo limbo 5—6-dentato, dentibus latis obtusis. *Corolla* 5—6 petala, petalis sessilibus obtusis subconcavis, caducis. *Stamina* numerosa, simplici serie disposita. *Stylus* simplex, teres, stigmate minimo depresso vix distincto terminatus. *Capsula* globoso-depressa, 3- rarissime 4-locularis, loculis polyspermis. *Semina* numerosa parvula subulata. *A. Rich.*

557. *M. robusta*, foliis ellipticis ovatisve coriaceis obtusis emarginatis petiolatis glabriusculis subtus punctatis utrinque pulchre reticulato-venosis, corymbis terminalibus, pedunculis subtrifloris, calycibus bracteis ramulisque ferrugineo-tomentosis.

Rata ab incolis dicitur, *R. Cunningham.*

New Zealand (Northern Island). Forests of Wangaroa, Hokianga, &c., at some distance from the sea-coast.—1826, *A. Cunningham.*—1834, *R. Cunningham.*

Arbor procera, sæpe usque 80-pedalis alta, comâ irregulari, ramis glabris teretibus. *Folia* opposita, elliptica, ovalia vel oblongo-ovata. Facie *Ligustri*; apice rotunda vel emarginata 1 vel sesquiunciam longa. *Flores* pulcherrimi, purpureo-rubicundi, pedunculati, corymbosi, terminales, bracteis obovatis concavis deciduis. *Stamina* numerosa, petalis unguicularibus persistentibus quater longiora stylum subæquantia. *Stigma* tubulosum. *Capsula* obovata trilocularis, tubo turbinato calycis circumcingente adhærens, polysperma. *Semina* linearia, subulata.

A noble *tree*, frequent in the dense forests of the Northern Island, where it not unusually attains the height of 80 feet; becomes ramified at from 30 to 60 feet from the ground, and beneath the branches, which are of very irregular growth, the trunk varies from 3 to 7 feet in diameter, according to the extreme height of the tree. The wood is hard, close-grained, very durable, and hence admirably adapted for ships' timbers and the construction of agricultural implements. A colonial trading vessel from Port Jackson was built by Messrs. Macdonell at Hokianga in 1828, the principal timbers of which were of the *Rata*; and the experiment answered so well, that they are now

engaged in the construction of another ship on the same stocks and of similar material. The natives entertain the notion that this tree, the *Rata*, and the following very distinct species, which they call *Pohutu-Kawa*, are the same, but that the former is the *Wahéné* or female!

558. *M. tomentosa*; foliis ellipticis coriaceis acutiusculis breviter petiolatis utrinque reticulato-venosis superne glabris, subtus ramulis calycibusque albo-tomentosis, corymbis terminalibus paniculatis, pedunculis trifloris. *A. Rich. Fl. Nov. Zel. p.* 336. *t.* 37.—Callistemon ellipticum. *A. Cunn. Ms.* 1826.

Pohutu-Kawa ab incolis vulgo vocatur. *A. C. Yate.—Poutu-Kaoua*, nom. vernac. sec. *D'Urville.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Rocky sea-coast and shores of the Bay of Islands, within range of the tide.—1826, *A. Cunningham.*

Arbor vix 30 pedalis alta, habitu irregularis, ramulis teretibus, cano-tomentosis. *Folia* opposita, elliptico-acuta, basi sensim angustata, margine revoluta, 2½—3 pollices longa. *Flores* sat magni, speciosi, splendide coccinei, in racemum terminalem paniculato-corymbosum digesti racemis, ramis ramulisque trichotomis, basi articulatis niveo-tomentosis. *Stamina* numerosa, petalis subunguiculatis deciduis multoties longiora stylum paulo superantia. *Capsula* ovoideo-obtusa, calyce cincta, ima basi tantum adhærens, trilocularis, polysperma. *Semina* subulata adscendentia.

An ordinary sized tree, inhabiting usually the immediate sea shore, where it is readily distinguished among other plants by the brilliancy and abundance of its flowers. The wood of the tree also is exceedingly hard, close-grained and heavy, equally valuable for ship building and implements of husbandry. It usually enlivens the shores of the Northern Island with its blossoms in December.

559. *M. florida*, foliis obovato-oblongis glabris lucidis venosis, subtus discoloribus punctatis, thyrso terminali calycibus oblongis turbinatis, ramulis radicantibus. *Sm. in Linn. Soc. Tr. v.* iii. *p.* 268. *DC. Prodr.* iii. *p.* 224. *A. Rich. Fl. Nov. Zel. p.* 333.—Leptospermum scandens. *Forst. Char. Gen. t.* 36. *f.* 1.

Raka-pika ab incolis dicitur. *R. Cunn.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Dense forests at the Bay of Islands, Wangaroa, &c. climbing to the summits of the loftiest trees.—1826, *A. Cunningham.*—1833, *R. Cunningham.*

Frutex ramosus, ramis glabris radicantibus scandentibus. *Folia* opposita, elliptico-oblonga, venosa, venis primariis parallelis in nervum margini approximatum desinentibus, utrinque minutissime et copiosissime punctatis. *Flores* in thyrsum coarctatum terminalem dispositi. *Calycis tubus* elongatus fere quemadmodum *Caryophylli* turbinatus, limbus 5-lobatus, lobis persistentibus rotundatis obtusis. *Petala* 5, flavescentia, unguiculata, obtusa, margine membranacea, tenuissime lacerata. *Stamina* numerosa, rubicunda,

petalis deciduis plus duplo polysperma, stylum æquantia. *Capsula* trilocularis, polysperma. *Semina* minuta, cuneiformia.

560. *M. diffusa*, ramulis radicantibus, foliis ellipticis ovatisve acuminatis venosis utrinque glabris nitidis, paniculis axillaribus terminalibusve, pedicellis oppositis, ramulisque pilis rigidis curtis conspersis, calycibus campanulato-urceolatis. *Sm. in Linn. Soc. Tr. v.* iii. *p.* 268. *DC. Prodr.* iii. *p.* 224. *A. Rich. Fl. Nov. Zel. p.* 333.—Melaleuca lucida. *Linn. Suppl. p.* 342. *non Forst.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* In dense forests at Wangaroa, adhering to the trunks of the largest timber trees.—1826, *A. Cunningham.*

Frutex ramosus, glaberrimus. *Ramuli* radicantes. *Folia* elliptica, acuminata, obtusa, petiolata, lucida, revoluta ab basin trinervia. *Panicula* ramosa plerumque terminalis. *Calyx* campanulatus, persistens, limbus 5-lobatus, lobis obtusis. *Petala* 5, lutea, breviter unguiculata, concava, obtusa, tenuissime ciliata decidua. *Stamina* flavescentia, petalis quater longiora, stylum æquantia. *Capsula* globosa, trilocularis, trivalvis. *Semina* ——?

561. *M. ? lucida*, foliis lanceolatis utrinque acuminatis aveniis enerviis, floribus terminalibus congestis sessilibus. *A. Rich. Fl. Nov. Zel. p.* 333. —Melaleuca lucida. *Forst. Prodr. n.* 216. *non Linn.*

New Zealand.—1773, *G. Forster.*

Obs. A very little understood species, not noticed by M. DeCandolle, and only by M. A. Richard from Forster with a mark of doubt.

562. *M. hypericifolia*, glabra, ramis radicantibus, foliis sessilibus ovalibus oblongo-lanceolatisve obtusis cum apiculo utrinque glabris, junioribus subciliatis, subtus venosis ad basin triplinerviis, racemis brevibus subpaniculatis lateralibus ramulisque pubentibus, calycibus subinfundibuliformibus.

New Zealand (Northern Island). In dense forests, adhering to trees, near the Kahio river, Wangaroa,—1833, *R. Cunningham.*

Frutex subscandens, cortice ramulorum pallide testaceo membranaceo pubente laxo, facile separabili. Rami stricti, teretes, juniores foliati. *Folia* opposita, sessilia, basi rotundata, uncialia subtus discoloria. *Flores* racemosi rubicundi. *Calycis limbus* quinquedentatus, dentibus brevibus deciduis. *Petala* 5, rosea, glabra, obtusa, caduca. *Stamina* numerosa, petalis plus triplo longiora, stylum æquantia. *Capsula* parva, globosa, leviter pubens (loculicido-dehiscens) 3-locularis, 3-valvis, valvis medio septiferis.

563. *M.? salicifolia*, glabra, racemis strictis virgatis, foliis lineari-lanceolatis elongatis acuminatis subfalcatis lævigatis, margine revolutis.

New Zealand (Northern Island). Forests of Wangaroa.—1833, *R. Cunningham.*

Arbuscula gracilis elegans, ramis teretibus pallidis sæpe et præsertim ad axillas radicantibus. *Folia* (3—5 uncialia) opposita valde angusta, attenuata coriacea, nitidissima, parce punctata, venosa. *Flores* nondum vidi.

3. Eugenia, *Mich., L.*

564. *E. Maire*, glabra, pedunculis axillaribus multifloris (4—12) folio sublongioribus racemosis, pedicellis infevioribus oppositis 2—3-floris, foliis

ovato-lanceolatis acuminatis basi attenuatis petiolatis, fructu ovato turbinato.

Mairi-tawaka ab incolis vulgo vocatur.

New Zealand (Northern Island). Alluvial banks of rivers, Bay of Islands, &c.—1833, *R. Cunningham.*

Arbor 30—40 pedalis. *Rami* pallidi, glabri, sparsi, alterni. *Flores* numerosi, axillares, calycibus coloratis. *Drupa* monosperma, lobis calycis obtusis ample coronata.

4. Myrtus, *L.*, *Gart.*

565. *M. bullata*, pedunculis axillaribus 1- rare 2-floris vix folio longioribus, pubescentibus apice bibracteatis, bracteis deciduis, foliis rhombeo-ellipticis acutiusculis ovato-orbiculatisve petiolatis alte bullatis supra glabris, subtus coloratis ramulisque dense pubentibus, calycibus tuberculatis, pilosis quadrilobis. *Sol. Ms. in Bibl. Banks.*

Rama-rama indigenis.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Shady woods, Bay of Islands, flowering in December.—1826, *A. Cunningham.*—1834, *R. Cunningham.*

Arbuscula gracilis, 10—15 pedalis, ramis virgatis patentibus. *Folia* opposita. *Flores* albi. *Stamina* numerosa, longitudine styli. *Lobi calycis* elliptici, acuti, concavi. *Petala* 4, orbiculata, concava, leviter crenulata, ciliata. *Bacca* verrucosa, bilocularis di- vel oligo-sperma. *Semina* reniformi-incurva.

[To be continued.]

BIBLIOGRAPHICAL NOTICES.

Genera et Species Gentianearum, adjectis Observationibus quibusdam Phytogeographicis, auctoris Aug. Henr. Grisebach, M.D., &c. &c.

This extremely valuable work, which we some time ago announced, in the 'Companion to the Bot. Magazine,' as being in a state of forwardness, has at length appeared at "Stuttgard and Tubingen," in one volume, 8vo. It is one of the most learned and accurate works which we have seen for a long while, and does infinite honour to the industry and acquirements of the learned author.

The preface is followed by a disquisition on the *Gentianeæ*, which is full of valuable information. First, the character of the natural family is ably discussed; then follow its affinities; and lastly, the geographical distribution. The number of species the author describes is 343, or about $\frac{1}{230}$th of the known portion of the vegetable kingdom. These are dispersed over a considerable portion of the world: but it is to be observed that no species have been found in several of the isles of the Pacific Ocean, in tropical New Holland, in the islands of Timor, Sumatra, and other of the Polynesian group,

nor in the African deserts, the shores of Venezuela, and scarcely in the mountains of the South of Europe. Two hundred and ten species are found in the tropics; 133 are extra-tropical, of which 45 inhabit the southern hemisphere. The New World affords 180 species, the old 175: but 12 are common to both. The higher mountains of the Andes yield the greater proportion of species (51), then follows tropical Brazil (46), the Himalaya Mountains (41), the United States (33), the Alpine Flora of Europe and Siberia (32), Hindostan (30), the Cape of Good Hope (25). One hundred and thirty-five species flourish at an elevation exceeding 5000 feet above the level of the sea, 230 below that elevation. The maximum of the family may be considered alpine; nevertheless the species are rare or altogether wanting in the Alps of Mexico, Java, on the Peak of Teneriffe, and of Sicily.

The following is Dr. Grisebach's Conspectus *Gentianearum* ex methodo analytico dispositus.

A. Æstivatio corollæ dextrorsum contorta.

a. Stylus distinctus, deciduus.

a. a. Antherarum loculi absque connectivo oppositi! Corolla rotata, circa capsulam marcescens. Trib. I. Chironieæ.

b. b. Antheræ connectivo instructæ.

a. a. Semina placentæ immersa. Inflorescentia centrifuga, dichotoma.

α. Corolla spectabilis, sæpius rotata, demum circa capsulam marcescens. Trib. II. Chloreæ.

β. Corolla parvula, infundibuliformis, demum aut supra capsulam torta aut decidua. Trib. IV. Erythræaceæ.

b. b. Semina funiculis imposita! Inflorescentia centripeta. Trib. III. Hippieæ.

b. Stigma ovario stylo persistenti impositum.

a. a. Inflorescentia dichotoma. Sepala connexa. Stylus distinctus. Trib. V. Lisyantheæ.

b. b. Inflorescentia racemiformis. Sepala sublibera l. membrana intracalycina juncta. Stylus sæpius 0. Trib. VI. Swertieæ.

B. Æstivatio corollæ induplicativa. Trib. VII. Menyanthideæ.

I. Chironieæ.

A. Stigma indivisum. Antherarum rima contigua.

a. Placentæ valvares. Antherarum rima elongata ... 1. *Chironia*, L.

b. Placentæ demum centrales liberæ. Antherarum rima poriformis .... 2. *Exacum*, L.

B. Stigma bicrure. Antherarum loculi distincti.

a. Antheræ strictæ rimæ poriformes. Stigma immutatum ..... 3. *Dejanira*, Cham.

b. Antheræ spirales rima elongata. Stigma spirale. *Sabbatiæ Sect. Pseudochironia.*

II. Chloreæ.

A. Stigmata bina.
a. Stigmata bilamellata, immutata.
a. a. Corolla rotata 5—8-mera. Calyx exalatus..... 4. *Chlora*, L.
b. b. Corolla infundibuliformis 4-mera. Calyx alatus l. carinatus ..... 6. *Schultesia*, M.
b. Stigmata bicruria, demum torta. Corolla rotata ... 5. *Sabbatia*, Ad.
B. Stigma capitulatum. Corolla rotata ..... 7. *Ixanthus.*

III. Hippieæ.

A. Calyx calyculatus. Corolla rotata. Stigma 2-lamellatum ..... 8. *Coutoubea*, Aubl.
B. Calyx nudus, æqualis. Corolla infundibuliformis. Stigma capitulatum. Capsula unilocularis ... 9. *Hippion*, Sprgl.
C. Calyx inæqualis. Corolla infundibuliformis. Stigma capitatum. Capsula semibilocularis..... 10. *Enicostema*, Bl.

IV. Erythræaceæ.

A. Corolla regularis.
a. Placentæ valvares.
a. a. Antheræ spirales. Genitalia exserta ..... 11. *Erythræa*, Ren.
b. b. Antheræ immutatæ (l. si subtorta, calyx tubulosus, stigmata bicruria Zygostigma.)
α. Stigma bilamellatum ..... 13. *Orthostemon*, Br.
β. Stigmata bicruria conglutinata! Calyx carinatus ..... 12. *Zygostigma.*
γ. Stigma capitulatum ..... 15. *Cicendia*, Ad.
b. Placenta centralis.
a. a. Stigma indivisum l. emarginatum.
α. Antheræ immutatæ. Corolla decidua ..... 16. *Schueblera*, Mart.
β. Antheræ aut demum recurvæ aut in spiculum discolorem productæ. Corolla marcescens... 18. *Sebæa*, Br.
b. b. Stigma bilamellatum. Flos tetramerus..... 17. *Apophragma.*
B. Corolla bilabiata ..... 14. *Canscora*, Lam.

V. Lisyantheæ.

A. Stigma bilamellatum.
a. Calyx imbricatus.
a. a. Filamenta tubo inserta. Corolla infundibuliformis, tubo constricto ..... 19. *Lisyanthus*, Aubl.
b. b. Filamenta membranæ annulari inserta. Corolla hypocrateriformis, tubo cylindrico..... 24. *Leiothamnus.*
b. Calyx valvaris.
a. a. Calyx exalatus. Corolla infundibuliformis... 20. *Irlbachia*, Mart.
b. b. Calycis suturæ alatæ. Corollæ faux campanulata ..... 25. *Prepusa*, Mart.
c. c. Calyx dorso angulatus. Annulus hypogynus. Corolla faux clavata ..... 23. *Tachia*, Aubl.

B. Stigma indivisum, capitulatum.
a. Filamenta imo tubo inserta.
a. a. Annulus hypogynus. Corolla hypocrateriformis ..... 22. *Tachiadenus.*
b. b. Annulus 0. Corolla infundibuliformis ..... 21. *Leianthus.*
b. Filamenta summo tubo inserta, brevia, corollæ tubus demum scissus!..... 26. *Voyra*, Aubl.

VI. Swertieæ.

A. Capsula unilocularis.
a. Foveæ epipetalæ glanduliferæ nullæ.
a. a. Stigmata lateralia ..... 31. *Pleurogyne*, Eschh.
b. b. Stigma capituliforme crassum ..... 30. *Centaurella*, Mich.
c. c. Stigmata 2 revoluta, aut si contigua infundibuliformia.
α. Placentæ cum endocarpio connatæ. Herbæ erectæ ..... 27. *Gentiana*, L.
β. Placentæ suturis impositæ. Volubiles..... 28. *Crawfurdia*, Wall.
b. Foveæ epipetalæ glanduliferæ.
a. a. Petala calcarata ..... 35. *Halenia*, Borkh.
b. b. Calcara nulla.
α. Foveæ fimbriis cinctæ.
αα. Stigmata distincta, stylo imposita. Semina subdefinita, suturæ valvularum inserta..... 36. *Frasera*, Walt.
ββ. Stigma reniforme, ovario impositum, Placentæ cum endocarpio connatæ..... 37. *Swertia*, L.
β. Foveæ squamula tectæ.
αα. Corolla basi coronata. Placentæ cum endocarpio connatæ ..... 32. *Anagallidium.*
ββ. Corolla basi nuda. Placentæ suturales spongiosæ ..... 33. *Ophelia*, Don.
B. Capsula bilocularis, placenta centrali. Petala extus glandulosa ..... 34. *Exadenus.*
C. Bacca, seminibus triseriatis. Volubiles..... 35. *Tripterospermum*, Bl.

VII. Menyanthideæ.

A. Semina in nervo medio valvulæ cujusque uniserialia. Capsula ruptilis..... 39. *Menyanthes*, L.
B. Placentæ suturales.
a. Capsula bivalvis, valvis bifidis ..... 38. *Villarsia*, Vent.
b. Capsula evalvis ..... 40. *Limnanthemum*, Gmel.

The Natural History of the Sperm Whale, &c., to which is added a Sketch of a South-Sea Whaling Voyage. By Thomas Beale, Esq. Surgeon. 8vo. John Van Voorst, London.

This is a second and much enlarged edition of a work published a few years ago, and is certainly one of the most valuable contribu-

tions we have received towards the history of this curious and very imperfectly known race of animals. The author believes that there is only one species of sperm whale, common to all the various latitudes in which it is found, from Japan to the mouth of the Thames, and that it is the largest of the sea animals, old males at times attaining the enormous length of 84 feet, and the females about one fifth less, while according to Scoresby, the largest Greenland whale seldom exceeds 70—72 feet. He corrects many points in the history of this animal as given by Lacépède, Cuvier, and others, and shows most decidedly, that in the accounts they have given, they have very often confounded the habits of the different species of whales. They are said to feed on cuttlefish (*Octopus*) and small fish, and are very quiet and inoffensive unless attacked. The latter part of the work consists of an interesting account, written in a very lively style, of the author's adventures as Surgeon in a South-Sea Whaler.

Flora excursoria Hafniensis. Scripsit S. T. N. Drejer. Hafniæ, 1838. 12mo.

This interesting little work is a Flora of two islands at the mouth of the Baltic, and is full of valuable observations. It appears to have been executed with great care, and we doubt not will attract much attention in this country from the great similarity of its plants to those included in the British Flora, but more particularly to those of Scotland.

The author distinguishes *Circæa intermedia* from *C. alpina* by the form of its fruit, which we suspect is an uncertain character, and describes *C. lutetiana* as without bractea, which is incorrect, since they may always be detected, although usually very minute and setaceous. *Aira caryophyllea* and *præcox* he refers to *Avena*, and makes *cæspitosa* the only representative of the former genus.

He introduces a new *Poa*, denominated *adspersa*, "culmo lævi superne nudo vaginis lævibus internodio brevioribus suprema folio suo multo breviore, ligula elongata obtusa," and includes in his list *P. fertilis*, Host., and *P. costata*, Schum. In the genus *Myosotis* the proportional length of the style and calyx or fruit has been introduced, and we believe for the first time used as a specific character in all the species. We have not time to examine into its value, but esteem it well deserving of attention. *Viola canina* is divided into several species, but apparently without sufficient cause; we believe that it will be found that *V. lactea*, Sm., referred by Koch to *lancifolia*, Thore, *V. stagnina*, Kit., which is the *lactea* of Reich. Icon.

f. 208, and *V. Ruppii*, All., are only modifications of one species. The most certain characters in this genus will be found in the spurs to the anthers. In the *Chenopodiaceæ* Meyer's arrangement has been adopted, by which several true species of *Chenopodium* are referred to *Blitum*. *C. polyspermum* and *acutifolium* are combined, but *C. viride* is kept distinct from *C. album*; *C. rhombifolium*, Mühl., which is the *urbicum* of Eng. Bot., is separated from the true *urbicum* of Linnæus, notwithstanding the observation of Koch, that they proved to be only varieties by repeated culture. Our author's *Blitum botryoides* does not appear to be the same as *C. botryoides*, Sm., for he says, "caule erecto ..... racemis subaphyllis," but Smith describes the stems as "spreading or prostrate," and the spikes leafy. In *Atriplex* the names have been remarkably transposed, but the descriptions are so good as clearly to point out what plants are intended; *A. angustifolia* is probably a form of *A. erecta*, Sm., which appears to be far from a rare plant in this country; *A. patula* is *rosea*; *A. latifolia* is the true *patula* of Linnæus and Smith, and *A. longipes* is probably our *angustifolia*, the only doubtful point being that he describes the fruit-bearing calyces as "longe pedunculatis." *Statice rariflora*, given as a new species, appears to be our *S. spathulata*; *S. limonium* (*balusiensis*) Fries Mantiss. p. 10, is referred, on the authority of a specimen, to this plant. A new *Juncus* is introduced between *conglomeratus* and *effusus*, under the name of "*J. subuliflorus*, anthela supra decomposita laxa ramis exterioribus reliquos multum superantibus anthelam minorem gerentibus, caps. obovata truncatula, stylo mammillæ elevatæ insidente." We think it probable that all three will ultimately be combined. The genus *Polygonum* is divided; *Centinodium* (*P. aviculare*), *Tinaria* (*P. convolvulus* and *dumetorum*) and *Fagopyrum* (*P. fagopyrum* and *tataricum*) being separated from it. The latter of these we hold to be a good genus, the others only sections of *Polygonum*. In *Ranunculus*, Smith's *aquatilis* is divided into *aquatilis*, *circinatus* and *fluitans*, three plants distinguished by well-marked and permanent characters, and now recognised by almost every continental botanist, although not as yet adopted in this country. *Platanthera solstitialis* is *H. fornicata*, Bab., *P. bifolia*, Reich., f. 1143. To this he refers Sven. Bot., t. 314, which is the true *O. bifolia*, Linn.

We have gone somewhat into detail in reviewing this work, for the purpose of drawing the attention of English botanists to the local Floras of the continent, many of which are of great value to the descriptive botanist. We purpose noticing some of the others in future numbers.

The Bee-Keeper's Manual; or, Practical Hints on the Management and Complete Preservation of the Honey-Bee. By Henry Taylor. Second Edition, considerably enlarged. London, Groombridge, 1839.

In a late number of our Journal we had occasion to notice the appearance of a second edition of Dr. Bevan's valuable work, the 'Honey-Bee.' We are glad to see the increasing interest which the subject of the œconomy of bee-keeping excites,—a fact which is shown by the numerous manuals, which appear in rapid succession from the press. The one now under our notice, 'The Bee-Keeper's Manual,' is a useful compendium of the natural history of the Bee, with observations and hints on their habits and treatment. The author gives the result of his own experience, and describes various kinds of hives, some of his own construction. He also quotes the opinions of Gelieu, Nutt, Payne, and other apiarians, who have devoted their attention to the subject. One great object he has in view is to show the needless cruelty of destroying bees, in any kind of hive, to obtain their honey, and that the true interest of the proprietor is best promoted by adopting the "humane or depriving system."

The author describes, amongst various hives, a new one, which he calls the *Nadir Hive*, constructed from an observation of the disposition of bees to work downwards. It consists of two boxes, one placed over the other, with a communication between them. We conclude our notice of this excellent little work by recommending it to all who are interested in the subject of bee-keeping.

A Botanical Chart for Schools. By Miss Elizabeth Andrew Warren.

This excellent Chart, prepared by a lady whose accurate researches in British botany have obtained for her a name which will rank with those of Miss Hutchins and Mrs. Griffiths (and we scarcely know if, botanically speaking, we can pay her a higher compliment)—ought to be in the hands of every teacher of youth throughout the kingdom. It was compiled, as the accomplished authoress tells us, expressly for the use of Miss James' school at Falmouth; and believing it would be useful in other similar establishments, she has, at much labour and cost, submitted it to the public. The system adopted is that of Linnæus, as the most ready for beginners; and after some preliminary observations there are three columns extending the whole length of the Chart—the first, a very broad one, contains a character of each class, with copious remarks on the more useful and valuable

species belonging to it; a second column defines the orders and states the number of genera they contain; and the third enumerates a list of genera.

Flora Aberdonensis; comprehending a list of the Flowering Plants and Ferns found in the neighbourhood of Aberdeen, with remarks on the Climate, the Features of the Vegetation, &c. By George Dickie, A.M., &c. &c.

This is a useful little manual for the botanical students of Aberdeen; and the preface, containing as it does very interesting facts relative to the influence of climate, soil, &c., upon vegetation, will be read by more distant botanists with interest. The catalogue includes such flowering plants and ferns as are found growing in a range extending about fifteen miles round Aberdeen. The stations are very exactly given, for the author has either seen dried or living specimens, or has himself gathered in the district nearly all the species mentioned: the total number is 584. The following remarks occur regarding the plants which contribute to the formation of peat: "The surface of the country is interspersed with marshes or bogs, lakes or lochs, woods and moors, and these are very productive of the plants producing the varieties of *peat*, severally named by McCulloch (Edin. Phil. Journ. vol. ii.) *mountain, marsh, forest*, and *lake* peat. In our marshes and bogs the plants which mostly contribute to the formation of this very important natural production are several species of *Carex*, as *C. dioica, C. pulicaris, C. ampullacea. C. curta*, and sometimes *C. teretiuscula*; also *Erica tetralix, Eriophorum angustifolium*, and *E. vaginatum*; also various species of *Juncus*, the *Menyanthes bifoliata, Caltha palustris, Pedicularis sylvatica* and *palustris, Comarum palustre*, and, more rarely, *Drosera Anglica, Schoenus nigricans*, and many others. In such places, and also on the borders of lochs, we find what are called quaking bogs, consisting of a semifluid mass of peat, the surface of which is covered with vegetation. The adventurous botanist, whose ardour leads him into such situations, entirely owes his safety to the matted roots and stems of the different plants.

In lochs the following plants principally contribute to the formation of peat: *Scirpus lacustris, Arundo Phragmites*, the yellow and white water lilies, *Sparganium natans, Phalaris arundinacea*, &c., and about their edges in shallower water, *Littorella lacustris, Scirpus setaceus, Peplis Portula*, and, more rarely (in this district), *Subularia aquatica, Pilularia globulifera, Lobelia Dortmanna, Utricularia intermedia*, and others. The variety called Mountain Peat is produced in

drier places, and is of a loose texture ; the different heaths, the Crowberry (*Empetrum nigrum*), various species of *Carex*, as *C. binervis*, *C. pilulifera*, *Nardus stricta*, and many grasses and others, all assist in the formation of this variety. Our woods abound in *Erica cinerea* and *E. tetralix*, *Trientalis europea*, *Galium saxatile*, *Goodyera repens*, many grasses and other plants, whose remains, mixed with decayed leaves and branches of trees, all combine to form the *forest peat*. Many of the plants enumerated, however insignificant they may appear to be, have contributed, in no mean degree, to modify the nature of the surface of the district, and perhaps also its climate, by the filling up of lakes and marshes (by the formation of peat), a process still going on.

Mr. Dickie is known to botanists as the discoverer, in conjunction with Mr. Templeton, of the rare northern *Carex rupestris* (Brit. Fl. ed. 4. p. 331) at the top of Glen Callader. We heartily wish he would publish a similar catalogue and with similar observations to the present, of the alpine vegetation of Aberdeenshire and the adjoining counties.

Commentationes de Leguminosarum Generibus. Auctore Georgio Bentham, Vienna.

This work exhibits great talent and great research, as may be expected from the well-known character of the author, and it is to be considered as the forerunner of a more elaborate publication on this extensive and difficult family. The tribes here discussed are *Podalyrieæ*, *Sophoreæ*, *Dalbergieæ*, and *Phaseoleæ*. Many new genera are given, and amended characters of previously established ones, and numerous species are described.

The same distinguished botanist is also engaged in a Monograph of the Linnæan genus *Erica* for the forthcoming volume of DeCandolle's Prodromus.

PROCEEDINGS OF LEARNED SOCIETIES.

BOTANICAL SOCIETY OF EDINBURGH.

November 8th, 1838.—Professor Christison, V.P., in the Chair.

The President was directed to convey to Mr. Christy, in the most special manner, the thanks of the Society for his very splendid contributions to the Herbarium and Library.

1. Professor Graham read an account of a visit which he along with some friends had paid to the West of Ireland in August last, to examine its botanical productions. It was stated that the mountains of Cunnamara present very little of the alpine vegetation with

which the mountains of Scotland are clothed,—a difference probably arising from their structure, the summits, or nearly two-thirds of their height, being composed of the most unproductive quartz. Near the base of the mountains some micaceous soil exists, and there a little alpine vegetation was found. The only peculiarity which the quartz presented was abundance of *Saxifraga umbrosa*. *Menziesia polifolia* was found to be scattered over a larger extent of country than was expected, being met with in abundance on the road sides from within a few miles of Galway to Clifden, the most westerly point visited. *Cnicus pratensis* occupied the situation which *Cnicus heterophyllus* usually holds in Scotland,—the latter not yet having been seen in Ireland. *Pimpinella magna* occurred in profusion along the road-sides between Galway and Oughterard. *Erica mediterranea* was ascertained to have been found in *three* stations in the West of Ireland, considerably remote from each other. The introduction of *Erica carnea* into the Irish Flora was understood to have arisen from a mistake.

2. Mr. Forbes exhibited specimens of the true *Primula elatior*, of Jacquin, gathered by him during the summer on the mountains of Styria. He pointed out the distinctions between these and the British specimens, and remarked that they confirmed the views he had formerly laid before the Society, in which he maintained that no true *Primula elatior* has hitherto been found in Britain. He also laid before the Society some specimens of *Viola pinnata*, from Mount Nanas, in Carniola, in order to show that the form of the filamental appendages in that species indicates a passage from the true Violets to the Pansies.

3. Professor Graham stated that some months ago he had received from Dr. Christison a root of *Ipomæa Purga*, now believed to be the plant which yields the true Jalap of commerce, and that when cultivated in the stove it had grown freely and produced flowers. It is altogether a different plant from that previously in cultivation.

December 13th.—Prof. Graham, President, in the Chair.

1. Mr. Brand read a paper containing remarks on the Statistics of British Botany, intended to illustrate the plan proposed to be adopted in the formation of the Botanical Society's British Herbarium. Besides detailing very fully the plan which he formerly suggested for dividing Great Britain and Ireland into 42 districts or Floras, from each of which, specimens of all indigenous plants, with certain exceptions, should if possible be obtained for the Society's Herbarium, Mr. Brand exhibited a series of elaborate Tables, deduced from an examination of Mr. Watson's excellent work on the Geographical Distribution of British Plants, and showed how far, and in what respect,

that work fell short of accomplishing Mr. Watson's design. It appeared from these tables that the 33 Local Floras and Catalogues consulted by Mr. Watson (besides being for the most part very imperfect in themselves) only *partially* represented the vegetation of 18 out of the 42 districts above-mentioned; and that with respect to the remaining 24 districts, his work had left us entirely in the dark. It further appeared, with regard to the districts represented by the 12 Floras and 19 Catalogues referred to by Mr. Watson,—extending (though by interrupted lines), the former from Devonshire to Edinburgh, the latter from Sussex to Orkney,—that out of 1220 species noticed in them, 317 occurred in *all* the Floras, and 156 were confined to *one or other of them*; and that 78 species occurred in *all* the catalogues, and 152 were peculiar to *one or other of them*; whilst, on the other hand, in the Floras only 64 species, and in the Catalogues only 50 species were peculiar to the *medium* numbers respectively; thus showing according to Mr. Brand's view a remarkable tendency in species to accumulate (as respects their frequency) towards extremes—that is to say, to be either *very generally* or *very partially* distributed over the country. On these and similar data, supported in some degree by other circumstances which he explained, Mr. Brand calculated that, allowing nearly 4000 for varieties, about 30,000 specimens would suffice for completing a British Herbarium on the plan which he proposed, requiring probably about 5000 leaves of paper.

The thanks of the Society were given to Mr. Brand for the labour bestowed in the preparation of this paper, and the valuable tables which it contained.

2. Mr. Forbes read an account of an excursion to the mountains of Ternova in Carniola, in company with Signor Tommasini of Trieste. They left Goritzia about the middle of June last, and proceeded to Chapovano by way of Monte Santo, gathering the true *Athamantha Matthioli* on the banks of the Izonzo, with several other plants of much interest. At Chapovano they ascended the Stoddier, thence they proceeded through the forests to the mountain of Bodanowitz, and on the third day ascended the Golaks, the highest mountains of the chain, being about 5800 feet above the level of the sea. Among the plants collected during the excursion, were *Lilium carniolicum, Hieracium incarnatum, Campanula carnica, C. spicata, Cytisus angustifolius, Aquilegia Sternbergii, Polygala austriaca* (new to the district), *P. alpestris, Pleurospermum Golaka, Spartium radiatum, Paederota Ageria, Carex firma* and *tenuis, Euphorbia carniolica, Primula carniolica, Hacquetia Epipactis, Astrantia carniolica, Gentiana*

angulosa, and many other species peculiar to those rarely visited mountains.

3. Mr. Brand exhibited a specimen of *Carex leporina*, found by him in 1830, during an excursion to Braemar and the mountains of Aberdeenshire.

4. Mr. Thomas W. Morrison exhibited specimens of the following plants from Cumberland and Westmoreland :—*Epimedium alpinum*, Wastwater, Cumberland ; *Impatiens noli-me-tangere*, Barron Wood, Westmoreland ; *Rosa gracilis*, Whinlater, near Keswick ; *Rosa cinnamomea*, Portinscale, near Keswick.

The Society then proceeded to the election of Office-Bearers for 1839, when the following gentlemen were elected :—

President.

Robert Graham, M.D., F.R.S.E., F.L.S., Hon. M.R.I.A., Regius Professor of Botany in the University of Edinburgh.

Vice-Presidents.

David Falconar, Esq. of Carlowrie.
Robert Christison, M.D., F.R.S.E., Pres. R.C.P.E.
Robt. Kaye Greville, Esq., L.L.D., F.R.S.E., F.L.S.
David Steuart, Esq.

Councillors.

William M'Nab, Esq., A.L.S.
W. F. Lindsay Carnegie, Esq. of Boysack.
Patrick Neill, Esq., LL.D., F.R.S.E., F.L.S.
Edward R. Roberts, Esq.
R. Wilbraham Falconer, Esq., Pres. Roy. Med. Soc.
Thomas Blizard Bell, Esq.

Treasurer : William Brand, Esq., W.S.—*Secretary :* William Hunter Campbell, Esq.—*Foreign Secretaries :* Edward Forbes, Esq., Pres. Roy. Phys. Society ; John Hutton Balfour, M.D., F.R.S.E., F.R.C.S.E.—*Curator :* John Hutton Pollexfen, M.D.—*Assistant Curator :* August Aemil Kellerman.—*Artist :* James M'Nab, Esq.

January 10th, 1839.—Professor Graham, President, in the Chair.

A letter to the President was read, from His Excellency the Minister Resident and Plenipotentiary of the King of Saxony, intimating that His Majesty had been graciously pleased to acquiesce in the proposal of the Society to elect His Majesty a Foreign Honorary Member.

It was resolved that on the occasion of so exalted a personage joining the Society, that the usual mode of election by ballot should be dispensed with ; His Majesty Frederick Augustus, King of Saxony, was accordingly elected a Foreign Honorary Member by unanimous acclamation.

1. Mr. Forbes read some observations on certain Continental Plants allied to British species. He exhibited to the Society speci-

mens of the various plants alluded to, chiefly collected by himself in Carniola, accompanied by critical remarks on their alliances and synonyms amongst British species. He noticed particularly the following:—1. *Rhinanthus hirsutus*, Lam. 2. *Acinos villosus*, Pers. 3. *Ranunculus verrucosus*, Prsl. 4. *Rubus tomentosus*, Borkh. 5. *Polygonum Bellardi*, All. 6. *Hieracium Peleterianum*, Merat.

2. Mr. Herbert Giraud read the first part of a paper on the Structure and Functions of Pollen. An account of this paper will be found in the Proceedings of the Society at the following meeting.

3. Mr. Brand read a communication explanatory of a scheme which he proposed for the publication of a work under the Society's direction, intended to give a general but comprehensive view of the whole range of Botanical Science, with reference both to its natural and civil history, and commencing with the earliest period in each department. He proposed that the work should consist of nine separate but connecting essays, forming as many divisions of the subject, and that the Society should invite its Members to write these several essays according to a plan, and on certain conditions specified by him. The proposal was referred to a Committee for consideration.

February 14th.—Prof. Graham, President, in the Chair.

1. Mr. Giraud read the second part of his paper on the Structure and Functions of Pollen. In the former part of this paper, after describing the phænomena which are attendant on the development of pollen in various tribes of plants, Mr. Giraud pointed out some peculiarities which he had met with in the external configuration and internal structure of the mature pollen grain, and showed that from the former character no correct indications could be deduced for determining the limits of certain groups of plants; as the figure and surface of the pollen-grain often differs widely even in individuals of the same genus. The existence of a *third* tunic, or investing membrane, was shown to occur in the pollen of *Crocus vernus*, and also the presence of minute opaque bodies on the surface of the pollen of *Polemonium cœruleum*, which, when immersed in water, appeared to be possessed of spontaneous motion. The true nature of the furrow which exists in certain spherical and elliptical pollen grains, was pointed out, and shown not to be a slit in the outer membrane, as is the opinion of some vegetable anatomists.

Mr. Giraud then described the chemical composition of pollen, showing the existence of potassa in the pollen of *Antirrhinum majus*; and of raphides, consisting of phosphate of lime, mixed up with the

pollen of *Tradescantia virginica*, and with that of certain species of *Orchideæ*. The effects produced by water, alcohol, æther, iodine, and sulphuric acid on the physical conditions of pollen, were also adverted to.

The functions of pollen were then noticed, and the phænomena which are attendant on the performance of those functions, from the period when the pollen leaves the anther till its tubes arrive at the base of the nucleus of the ovule. It was shown that a somewhat elevated temperature is in many cases necessary for the development of the pollen tubes, and that this condition is supplied by the evolution of caloric attendant on æstivation; and lastly, the various provisions, which exist for the preservation of the pollen from the deleterious effects of moisture, were pointed out.

2. Notes on *Lychnis dioica*, Linn., with reference to the occurrence of the varieties *vespertina*, *intermedia* and *diurna*, and some anomalous forms of these observed in the neighbourhood of Dundee. By Mr. Wm. Gardiner, Jun., Dundee. Communicated by Mr. Campbell.

3. Notes on *Primula vulgaris*, *elatior* and *veris*. By Mr. Wm. Gardiner, Jun., Dundee. Communicated by Mr. Campbell.

WERNERIAN NATURAL HISTORY SOCIETY.

January 12, 1839.—John Sligo, Esq., in the Chair.

Dr. Robert Paterson read a Memoir, Observations on the Artesian Wells of Clackmananshire, and their connection with the doctrine of Central Heat. As this paper does not refer directly to zoology or botany we shall not dwell upon it.

A paper on the Climate and Productions of Devonshire. By Dr. Chas. Goring, was then read.

Professor Jameson exhibited two rare Fishes found in the Pentland Frith and sent to the Natural History Museum by the Duchess Countess of Sutherland. He regarded them as *Labrus trimaculatus*, and the *Gadus minutus* or the *Poor*. A specimen of the *Ornithorhynchus* was exhibited, having the poison-duct and gland beautifully displayed; presented to the College Museum by Lord Glenelg. The carcass of a large Cinereous Eagle was also exhibited; being one of two birds of that kind which attacked a traveller the week before, near Newtown-Stuart in Galloway.

Jan. 26—Wm. Copland, Esq. in the Chair.

Mr. Smith of Jordan-hill, read an Account of further Observa-

tions on the elevated Marine Deposits in the Basin of Clyde, accompanied with remarks by Mr. Deshayes, Mr. Lyell, and Mr. G. R. Sowerby, on the Shells unknown as British imbedded in them; from which it appeared, that out of twenty species, seven are at present to be found recent in the Arctic Seas; five in the Crag and Sicilian newer Pliocene; and that the rest are peculiar to the deposit in question.

Dr. Trail exhibited a specimen of Bergmehl from the North of Sweden, communicated to him by Mr. Laing. The Doctor had submitted it to analysis, and found it to be composed of the minute shields of infusoria, about one thousandth part of an inch in size, consisting chiefly of siliceous earth and alumina. Professor Jameson exhibited a very fine specimen of flexible sandstone from the Himalaya Mountains, transmitted from India by Dr. Robert Stevenson.

February 9.—John Sligo, Esq., in the Chair.

A paper by Dr. Chas. R. Goring was read, on the Comparative Merits of the Reflecting Microscope of Sir D. Brewster, and the Catadioptric Engiscope of Prof. Amici of Modena, with an account of a new Reflecting Telescope for Terrestrial Objects. On this paper we will not dilate, as not bearing directly on the subject of our work. Dr. Goring is of the opinion, that however admirable Sir David's microscope may be in theory, it will not answer in practice.

A communication was then read, on the Geology of Greece and the Greek Islands, illustrated with numerous specimens.

Professor Wallace then explained by a model and diagram his solution of the Miner's Problem, in reference to the depths of different strata, &c.

February 23.—Dr. Thomas Stewart Traill in the Chair.

Mr. Edward Forbes laid before the meeting a communication on the *Asteriadæ* of the Irish Sea, illustrated by the exhibition of specimens. In his arrangement he chiefly followed the one recently proposed by Professor Agassiz, occasionally modifying it, and introducing a few new genera and species. As this valuable and original paper will appear in the forthcoming number of the Society's Transactions, we need not enter further into particulars*. Professor Jameson then exhibited a fine specimen of the Beaumaris Shark, taken off the coast of Aberdeenshire. The characters which distinguish it from the Porbeagle Shark were dwelt upon.

* We trust that arrangements have been made for the more regular publication of its excellent memoirs; vol. vi. was published in 1832; vol. vii., containing two Prize Essays and an Appendix, appeared in 1838.—Ed.

ZOOLOGICAL SOCIETY.

June 12, 1838.—The Rev. F. W. Hope in the Chair.

Mr. Owen communicated to the Meeting another portion of the results attending his examination of the body of the *Apteryx*, embracing a description of the parts connected with the function of respiration, and their general relations, as shown in this extraordinary bird, to that structure of the respiratory organs which is so eminently characteristic of the entire class.

Mr. Owen remarks, that the system of respiration in birds is so obviously framed with especial reference to the faculty of aërial progression, and the peculiarities in the former exhibit so marked a physiological relation to the latter, that in the *Apteryx*, where the wings are reduced to the lowest known rudimentary condition, the examination of the accompanying modifications in the respiratory apparatus presented a most interesting subject for inquiry.

Upon carefully removing the *viscera* from the abdomen, Mr. Owen was both gratified and surprised at finding no trace of air-cells in the abdominal cavity; the *diaphragm* being entire, and pierced only for the transmission of the *œsophagus* and larger blood-vessels, as in the *Mammalia*.

The position of the *diaphragm* was almost horizontal, like that of the *Dugong*, differing from it principally in relation to the heart and *pericardium*, which projected into the abdominal cavity, as through a hernial aperture, the *aponeurosis* of the *diaphragm* being continuous over the *pericardium*; an approach towards the oviparous type in the disposition of the *viscera* being thus preserved.

In the origins of the *diaphragm* Mr. Owen found the *crura* of the lesser muscle exhibiting a greater degree of development than is known to exist in any other bird; the *crura* were entirely tendinous, and arose from slight projections at the sides of the last costal *vertebræ*, their fibres expanding and being lost in the large aponeurotic centre; at the point of their expansion to join the *aponeurosis* a small proportion of muscular fibre was observed.

The abdominal surface of the *diaphragm*, as in the *Mammalia*, was principally in contact with the convex surface of the liver, but the thoracic surface of the former was separated from the lungs by a series of small but well-marked air-cells, one of which projected slightly through the anterior aperture of the thoracic-abdominal cavity at the base of the neck; the *Apteryx* thus still retains the ornithic type of structure, although presenting us with the only known instance, in the feathered race, of a species in which the receptacular portion of the lungs is not extended into the *abdomen*.

In the simplicity of its structure the *trachea* resembled that of the struthious birds, but there was no trace of a dilated membranous pouch as in the Emeu. The *trachea* consisted of 120 small rings, becoming gradually smaller to the last 20, and alternately overlapping and being overlapped at the sides, during the relaxation of the tube.

Mr. Owen remarks that the fixed condition of the lungs, and the existence of air-cells between the lungs and the *diaphragm*, clearly prove that inspiration cannot be effectually performed by the action of the *diaphragm* alone, but that it takes place in the *Apteryx* as in other birds, by the *sternum* being depressed, and the angle between the vertebral and sternal ribs being increased.

A communication was then read to the Meeting by Dr. Cantor, entitled, "A notice of the *Hamadryas*, a genus of Hooded Serpents with poisonous fangs and maxillary teeth."

Dr. Cantor commences with observing, that "since Dr. Russell embodied the results of his investigations in his unequalled work upon Indian Serpents, the attention which this branch of Indian zoology has received has been chiefly confined to occasional discoveries of *single* species; and yet from experience I have been convinced how rich this branch is, and how much still is left to be illustrated, not only with regard to species, but also with regard to the habits and the geographical distribution of this order of reptiles, the number and variety of which forms so prominent a feature in the zoology of Southern Asia.

"The venomous serpent, to which I shall here call attention, is the type of a new genus; which, from its inhabiting hollow trees and frequenting the branches, I propose to call *Hamadryas*. Its characters induce me to assign it a place between the genera *Naja*, Laurenti, and *Bungarus*, Daudin, which two forms it will be found to connect together.

HAMADRYAS.

Caput latum, subovatum, deplanatum, *rostro* brevi obtuso, *scutis* quindecim superne tectum.

Buccæ tumidæ.

Oculi magni prominentes, *pupillâ* rotundâ.

Nares latè apertæ, duorum scutorum in confinio.

Oris rictus peramplus, subundatus.

Tela antica, pone qua dentes maxillares.

Collum dilatabile.

Corpus crassum, teres, *squamis* lævibus, per series obliquas dispositis, imbricatim tectum.

Cauda brevis, apice acuto, *scutis* et *scutellis* tecta.

Hamadryas Ophiophagus. *Ham. supernè olivacco-viridis, striis sagittalibus nigris cinctus, abdomine glauco, nigro marmorato.*

Scuta abdominalia a 215 ad 245
Scuta subcaudalia a 13 ad 32
Scutella subcaudalia a 63 ad 71

Hab. Bengal.

Hindustanee name, 'Sunkr-Choar.'

"For the description and anatomical details, I beg to refer to my provisional description, published in the Asiatic Researches, vol. xx. p. 87., while I shall here confine myself to some general remarks upon the habits, the effects of the poison, and the history of this serpent.

"The *Hamadryas*, like the *Bungarus*, *Hydrus*, and *Hydrophis*, has a few maxillary teeth behind the poison-fangs, and thus like the latter connects the venomous serpents with isolated poison-fangs to the harmless, which possess a complete row of maxillary teeth.

"Of the terrestrial venomous serpents the *Bungarus* is chiefly characterized by a distribution of the teeth similar to that of the *Hamadryas*, which, also partaking of the chief characteristic of the genus *Naja*, viz. that of forming a hood or disc, constitutes an immediate link between the genera *Bungarus* and *Naja*.

"In consequence of the strong resemblance in the general appearance between the *Naja* and the *Hamadryas*, when first my attention became attracted to the latter, I thought I could refer this serpent to that genus; and it was not until I was able to examine a specimen whose poison-fangs were untouched (those of the first specimens I saw having been drawn by the natives, who are greatly afraid of this serpent), that I discovered the maxillary teeth behind the poison-fangs.

"*Hamadryas ophiophagus* differs from the *Naja tripudians*:

1. By its maxillary teeth.
2. By the strongly developed spines on the *os occipitale inferius*.
3. By the integuments covering the head.
4. By the integuments covering the abdominal surface of the tail.
5. By its colour.
6. By its size.

"According to the natives the *Hamadryas* feeds chiefly upon other serpents; in one I dissected I found remains of a good-sized *Monitor*, which fact may account for its arboreal habits, as I have in Bengal, along the banks of the rivers, observed numbers of those large lizards among the branches of trees watching for birds.

"The power of abstaining from food, generally speaking, so characteristic of the serpents, is but in comparatively small degree possessed

by this species; the most protracted starvation amounts to a period of about one month, while the *Vipera elegans*, the *Naja tripudians*, and the *Bungarus annularis*, have, without inconvenience, been confined in cages without any food for more than ten months. Two specimens of the *Hamadryas* in my possession were regularly fed by giving them a serpent, no matter whether venomous or not, every fortnight. As soon as this food is brought near, the serpent begins to hiss loudly, and expanding the hood rises two or three feet, and retaining this attitude as if to take a sure aim, watching the movements of the prey, darts upon it in the same manner as the *Naja tripudians* does. When the victim is killed by poison, and by degrees swallowed, the act is followed by a lethargic state, lasting for about twelve hours. Such of the other Indian venomous serpents, the habits of which I have had opportunity to study from life, show themselves much inclined to avoid other serpents, however ready they are to attack men or animals, when provoked or driven by hunger; and I am not aware of any other of those serpents being recorded as preying upon its own kind. A short time ago, however, during my sojourn at the Cape of Good Hope, I received from high authority the following fact, which throws a light upon the habits of the *Naja* of southern Africa, one of which, when being captured, threw up the body of a *Vipera arietans* (*Vip. brachyurus*, Cuvier), which bore marks of having been submitted to the process of digestion.

"The *Hamadryas*, like the greater number of Indian serpents, evinces a great partiality to water; with the exception of the tree-serpents (*Leptophina*, Bell), they all not only drink, but also moisten the tongue, which, as this organ is not situated immediately in the cavity of the mouth, become in the serpents two different acts *. Specimens of this serpent in my possession changed the skin every third or fourth month, a process which takes place in all the Indian serpents several times during the year. The *Hamadryas* is very fierce, and is always ready not only to attack but to pursue when opposed; while the *Cophias*, the *Vipera*, the *Naja*, and the *Bungarus*, merely defend themselves, which done, they always retreat, provided no further provocation is offered. The natives of India assert, that in-

* M. Schlegel is of opinion that serpents never drink. (*Essai sur la Physiogn. des Serpens, Partie Generale.*) As mentioned above, I have had opportunities of ascertaining that the greater number of Indian serpents are very fond of water, a fact which I am aware has also been observed in the African serpents by the eminent naturalist Dr. A. Smith, whose valuable discoveries, which he is at present engaged in publishing, will bring to light many facts, of which we are at present in almost total ignorance concerning the habits of animals, particularly those of the Reptiles.

dividuals are found upwards of twelve feet in length, a statement probably not exaggerated, as I have myself seen specimens from eight to ten feet in length, and from six to eight inches in circumference. I have often heard it asserted, that 'Cobras' (which name is naturally enough given to every hooded serpent,) have been met with of an enormous size, but I strongly doubt their belonging to the genus *Naja*; among a considerable number which have come under my observation, I never saw any exceeding five to six feet in length, while the common size is about four feet. Some time before I discovered the *Hamadryas*, I was favoured by J. W. Grant, Esq., of the Hon. Company's Civil Service, with an interesting description of a gigantic hooded serpent he had observed in the upper provinces, and which, he remarked, was not a *Naja*. By inspection this gentleman denied the *Hamadryas* to be identical with the above-mentioned.

"The natives describe another hooded serpent, which is said to attain a much larger size than the *Hamadryas*, and which, to conclude from the vernacular name, '*Mony Choar*', is perhaps another nearly allied species.

"The fresh poison of the *Hamadryas* is a pellucid, tasteless fluid, in consistence like a thin solution of gum arabic in water; it reddens slightly litmus paper*, which is also the case with the fresh poison of the *Cophias viridis*, *Vipera elegans*, *Naja tripudians*, *Bungarus annularis* and *Bung. cæruleus*: when kept for some time it acts much stronger upon litmus, but after being kept it loses considerably if not entirely its deleterious effects.

"From a series of experiments upon living animals, the effects of this poison come nearest to those produced by that of the *Naja tripudians*, although it appears to act less quickly. The shortest period within which this poison proved fatal to a fowl, was fourteen minutes; whilst a dog expired in two hours eighteen minutes after being bitten. It should however be observed, that the experiments were made during the cold season of the year."

A specimen of the present genus (*Hamadryas*), in the Collection of the Society, was upon the table, having been presented to the Museum by Sir Stamford Raffles, but without any facts respecting its history, or the locality in which he had procured it.

* "M. Schlegel asserts (loc. cit. p. 34,) the venom is 'ni alcalin ni acide.' The only way in which I can account for this mistake from a man who ranks among the first Erpetologists, is by supposing that M. Schlegel himself never had an opportunity of testing the poison of a living serpent; for besides the five above-mentioned genera of Indian venomous serpents, I found the fresh poison of different species of marine serpents (*Hydrus*) to possess the property of turning litmus paper red. The same fact with the *Crotalus* is noticed by Dr. Harlan, who says, 'The poison of the living *Crotalus* tested in numerous instances with litmus paper, &c. invariably displayed acid properties.' (Vide Harlan, Medical and Physical Researches, p. 501, sq.)"

Mr. Yarrell called the attention of the Meeting to some specimens of fish presented by Mr. Harvey, of Teignmouth, whom he stated to be on the point of quitting England for a residence in Australia, and to whose zealous exertions as a Corresponding Member the Society had on many occasions been largely indebted.—A vote of thanks was proposed and carried unanimously.

June 26, 1838.—William Horton Lloyd, Esq., in the Chair.

A specimen of the Peregrine Falcon was upon the table, which had been sent to the Society's office as a donation to the Menagerie, with the following letter addressed to Mr. Rees, from the donor, Capt. Charles Robertson :—

"Sir,

"I beg to present to you the accompanying Hawk, which was caught on board the ship Exmouth, on the 12th of February last, on her passage from Bengal to London, when in about latitude 12° north, and longitude 88°·30 east, which placed the ship about 300 miles from the Andaman Islands; and from observing the bird's tendency to fly away towards the east about the time of sunrise, for some days after it was caught, I am led to suppose that it must have been blown off, or followed its prey till out of sight of, those Islands. At the time that it was taken, it was in the act of devouring the remains of a sea bird on the main-topsail yard, which it had previously been seen to pounce down upon and take up from the sea.

"The injured leg was occasioned by a ring, to which it was attached when first caught, and the struggles of the bird to get away; but I have great hopes that it will regain in some measure the use of it by proper care and attention, which I was unable to give it; and it is now much improved to what it was, the two parts being more inclined to unite. I have fed it upon raw fresh meat, and young rats occasionally, but it never looks at water. When approaching the coast of England, it was very remarkable that the bird again struggled to get away in the direction of the land, although we were so far off as not to see it from the ship. I am not aware that this hawk differs from the common species, but the circumstances attending it may be interesting to a naturalist; and if it should be thought worthy of being added to your collection, I shall feel amply repaid for the trouble I have taken to preserve it.

"This is the second instance of a hawk being taken by me out of sight of land; and on the former occasion a sparrow took refuge in the cabin: we were at that time about 80 miles from Ceylon. From

these circumstances it is evident that hawks traverse great spaces of the ocean, being able to feed on the wing.

"I remain, Sir, your obedient Servant,

"CHARLES ROBERTSON."

18, Alfred-place, Bedford-square,
26th June, 1838.

The first part of a paper was then read by Mr. Blyth, entitled "Outlines of a Systematic Arrangement of the class *Aves*."

July 10th, 1838.—Wm. Ogilby, Esq., in the Chair.

A letter dated Tymaen Pyle, Glamorganshire, May 14th, 1838, was read, addressed to the Secretary by J. E. Bicheno, Esq., accompanying a donation to the Museum of a skin of the Burrhal Sheep from the Himalaya Mountains. The animal being quite new to the collection had been set up by Mr. Gould, and was placed in the room for exhibition. Mr. Bicheno writes as follows:

"I found the accompanying skin in the possession of a neighbouring gentleman, who left India last year; and as I apprehend it to belong to a rare animal, and hardly known in this country, I have, with his permission, sent it to the Museum of the Zoological Society. It is not possible for me, at this distance from authorities, to make it out satisfactorily, but it seems very near to the Asiatic Argal (*Ovis Argala*), if not identical; if so, however, it varies in many particulars from the descriptions given of that species.

"It was killed, June 1st, 1836, by Thos. Smith, Esq., 15th Native Infantry; known in India as one of the most intrepid sportsmen and best shots in the country. He met with it in the Great Snowy Range close to the Barinda Pass, communicating with Chinese Tartary, near also to the famous peak called Jaurnootrie, under which rises the river Tamna. He estimates the height at which he found the animal to have been from 15,000 to 17,000 feet: Humboldt, he thinks, calls the Berinda Pass 18,000 feet high.

"The hill-men call it Burrhal, and considered this specimen to have been seven years old by the horns. The cry was that of a tame sheep. It was exceedingly shy, and no animal in Mr. Smith's opinion is so difficult of approach. During his expedition in pursuit of the Burrhal he killed also the Thaar, which he took to be a species of Goat, and the 'Serow,' an Antelope, which Mr. Hodgson has described in the Journal of the Asiatic Society, No. 45, for Sept. 1835. The Thaar is also described in the same paper, and is regarded by him to be an Antelope. Mr. Hodgson suspects the Burrhal to be his *Ovis Nahoor*, but I have no opportunity of consulting the work."

An extract, forwarded by Mr. Bicheno, copied from the journal of Lieut. Thomas Smith, was also read, in which, after describing the great difficulty he found in reaching the district frequented by the Burrhal, he proceeds:

"I was at last repaid by seeing nine of them at about 600 yards, and they saw us. I attempted to get near; but no! they are without exception the most difficult animals in the world to get near; and the air being so rarified I could hardly breathe, my Paharrees constantly falling and declaring they *would* die, and begging me to return.

"About four o'clock, as I was just giving it up in despair, I suddenly came round a peak of snow, and found the large Ram at about 300 yards looking at me: despairing of ever getting nearer, and knowing my rifle would do it if only held straight, I beat a place in the snow and laid it along, taking a steady aim, pulled, and to my delight saw him fall on his side and kick. He recovered himself and crawled into some frightful rock, and there stood showing me his horns."

The animal was not eventually captured until it had received a large number of balls. "Thus I killed," says Lieut. Smith, "the first Burrhal ever killed by European or native that I can learn."

Mr. Ogilby observed, that the present animal, although extremely rare and valuable, had been for some time known to naturalists, by a specimen in the collection of the Linnean Society, and by the researches of Mr. Hodgson, who had described two species of sheep inhabiting the Himalayan range. Recently, however, Mr. Hodgson had changed his opinion with respect to the existence of two distinct species, referring them both to his *Ovis Nahoor*; but Mr. Ogilby believed that another species did inhabit the Himalaya Mountains decidedly distinct from the present, and the horns of which are so capacious, that the young Foxes are said to nestle in such as are found unattached to the animals.

A paper was then read, entitled, "Observations on Marine Serpents." By Dr. Cantor.

This communication embodies the results of Dr. Cantor's observations upon the habits and general conformation of the Marine Ophidians, a group of *Vertebrata* to which but little attention has hitherto been given, from the circumstance of the danger attending their examination in the living state, and also from their geographical distribution being entirely confined to the tropical seas. The author being stationed, in the East India Company's service, on the Delta of the Ganges, had, during a considerable period, most favourable opportunities for studying these serpents, many of which were

captured in the nets employed for fishing. His observations are principally directed to the anatomical characters which distinguish the marine from the terrestrial serpents, and to the modifications of structure by which the former are adapted to the element in which they exist. With respect to their physiology, the principal point of interest he establishes is, the circumstance of all the species, without exception, being highly venomous, a fact which has been denied by Schlegel, who states that the Marine Snakes are harmless; and the same erroneous idea is very current with the natives. Dr. Cantor in proof of the contrary refers to the recent death of an officer in Her Majesty's service, within an hour or two after the bite of a Serpent which had been caught at sea, and also to numerous experiments of his own, in which fowls, fish, and other animals invariably died within a few minutes after the bite had been inflicted. Numerous sketches were exhibited to the Meeting in illustration of Dr. Cantor's observations.

GEOLOGICAL SOCIETY.

Award of the Wollaston Medal to Dr. Ehrenberg of Berlin;—Extracted from the President's Address.

The Council have adjudged the Wollaston medal for the present year to Professor Ehrenberg, for his discoveries respecting fossil Infusoria and other microscopic objects contained in the materials of the earth's strata. We all recollect the astonishment with which, nearly three years ago, we received the assertion, that large masses of rock, and even whole strata, are composed of the remains of microscopic animals. This assertion, made at that time by Professor Ehrenberg, has now not only been fully confirmed and very greatly extended by him, but it has assumed the character of one of the most important and striking geological truths which have been brought to light in our time: for the connection of the present state of the earth with its condition at former periods of its history, a problem now always present to the mind of the philosophical geologist, receives new and unexpected illustration from these researches. Of about eighty species of fossil Infusoria which have been discovered in various strata, almost the half are species which still exist in the waters: and thus these forms of life, so long overlooked as invisible specks of brute matter, have a constancy and durability through the revolutions of the earth's surface which is denied to animals of a more conspicuous size and organization. Again, we are so accustomed to receive new confirmations of our well-established geological doctrines, that the occurrence of such an

event produces in us little surprise; but if this were not so, we could not avoid being struck with one feature of Prof. Ehrenberg's discoveries;—that while the microscopic contents of the more recent strata are all freshwater Infusoria, those of the chalk are bodies (*Peridineum*, *Xanthidium*, *Fucoides*,) which must, or at least can, live in the waters of the ocean. Nor has Prof. Ehrenberg been content with examining the rocks in which these objects occur. During the last two years he has been pursuing a highly interesting series of researches with the view of ascertaining in what manner these vast masses of minute animals can have been accumulated. And the result of his inquiries is*, that these creatures exist at present in such abundance, under favourable circumstances, that the difficulty disappears. In the Public Garden at Berlin he found that workmen were employed for several days in removing in wheelbarrows masses which consisted entirely of fossil Infusoria. He produced from the living animals, in masses so large as to be expressed in pounds, tripoli and polishing slate similar to the rocks from which he had originally obtained the remains of such animals; and he declares that a small rise in the price of tripoli would make it worth while to manufacture it from the living animals as an article of commerce. These results are only curious; but his speculations, founded upon these and similar facts, with respect to the formation of such rocks, for example, polishing slate, the siliceous paste called *kieselguhr*, and the layers of flint in chalk, are replete with geological instruction.

As the discoveries of Prof. Ehrenberg are thus full of interest for the geological speculator, so have they been the result, not of any fortunate chance, but of great attainments, knowledge, and labour. The author of them had made that most obscure and difficult portion of natural history, the infusorial animals, his study for many years; had travelled to the shores of the Mediterranean and the Red Sea in order to observe them; and had published (in conjunction with Prof. Müller) a work far eclipsing anything which had previously appeared upon the subject. It was in consequence of his being thus prepared, that when his attention was called to the subject of fossil Infusoria, (which was done in June, 1836, by M. Fischer) he was able to produce, not loose analogies and insecure conjectures, but a clear determination of many species, many of them already familiar to him, although hardly ever seen perhaps by any other eye. The animals (for he has proved them to be animals, and not, as others had deemed them, plants) consist, in the greater number of examples, of a staff-like siliceous case, with a number of transverse markings;

* Abhandl. Kön. Ak. Wissensch. Berlin. 1838.

and these cases appear in many instances to make up vast masses by mere accumulation without any change. Whole rocks are composed of these minute cuirasses of crystal heaped together. Prof. Ehrenberg himself has examined the microscopic products of fifteen localities, and is still employed in extending his researches; and we already see researches of the same kind undertaken by others, to such an extent, as to show us that this new path of investigation will exercise a powerful influence upon the pursuits of geologists. We are sure therefore that we have acted in a manner suitable to the wishes of the honoured Donor of the medal, and to the interests of the science which we all in common seek to promote, in assigning the Wollaston medal to Prof. Ehrenberg for these discoveries.

Although it is not necessary as a ground for this adjudication, it is only justice to Prof. Ehrenberg to remark, that his services to geology are not confined to the researches which I have mentioned. His observations, made in the Red Sea, upon the growth of corals, are of great value and interest; and he was one of the distinguished band of scientific explorers who accompanied Baron von Humboldt in his expedition to the Ural Mountains. And I may further add, that even since the Council adjudged this medal, Prof. Ehrenberg has announced to the Royal Academy of Sciences of Berlin new discoveries; particularly his observations on the organic structure of chalk; on the freshwater Infusoria found near Newcastle and Edinburgh, and on the marine animalcules observed near Dublin and Gravesend; and, what cannot but give rise to curious reflections, an account of *meteoric paper* which fell from the sky in Courland in 1686, and was found to be composed of Confervæ and Infusoria*.

MISCELLANEOUS.

A FEW PARTICULARS RESPECTING SOME RARE BIRDS WHICH HAVE LATELY OCCURRED IN THE VICINITY OF YARMOUTH.

Many varieties in ornithology having occurred in this neighbourhood since Messrs. Paget gave a list of them in their 'Sketch of the Natural History of Yarmouth,' it has been thought that the following notices respecting them might not be unacceptable.

A specimen of the honey buzzard was shot at Caistor, a village about two miles from hence, in the month of November 1837. From its size and the appearance of its plumage it was judged to be an immature female. This was not the only instance of its occurrence on our eastern coast during that season. A male bird was procured at

* An account of this curious substance will appear in our next Number. —Edit.

Southwold, and Mr. Hoy had recorded the capture of one in his neighbourhood not long before.

An adult male bird of the rose ouzel (*Pastor roseus*) was obtained in the same locality as the first-mentioned honey buzzard in the month of June 1836. This bird is now in the possession of J. H. Gurney, Esq. The Bohemian waxwing (*Bombycilla garrula*), and the crossbill (*Loxia curvirostra*) have both been shot three or four times in as many years. The hoopoe has been once, at least, taken here in that period.

Two specimens of the white-tailed eagle (*Haliäetos albicilla*) were procured last December—the one at Hasborough, the other at Ormesby.

I cannot avoid what may be deemed going out of my district to notice the occurrence of one of those birds whose loss every ornithologist must deplore. A fine female specimen of the great bustard (*Otis tarda*) was procured in the early part of May 1837, and was set up by Mr. King, of London Street, Norwich, in whose shop I saw it in the month of June. In size it was not more than a common turkey. The markings on the back and scapulars were exceedingly handsome. This bird, I believe, is now in the possession of the Hon. F. W. Keppel.

The occurrence of the *Tringa pectoralis* and *Tr. platyrhyncha* has already been noticed by Mr. Hoy in the 'Magazine of Natural History,' New Series, vol. i. in which place he has also mentioned the peculiar form of the bill of the latter bird, by which it may at once be distinguished.

The brown snipe (*Scolopax grisea*) was shot on Yarmouth Beach in October 1836. This bird had not completely obtained its winter plumage when procured. The bill is rugose and punctured at the tip in a similar manner to that of the common snipe. Why Dr. Leach should have given to it the name of *Macroramphus* is perhaps not easily accounted for. Its bill is certainly of a considerable length, but not so long in proportion as that of the common snipe. I was kindly favoured with the sight of this bird by Leonard Rudd, Esq. in whose collection it now is. The same gentleman has also specimens of the Kentish plover (*Charadrius Cantianus*) and one of the little gull (*Larus minutus*) which he shot at this place.

Mr. Stephen Miller of this town, the possessor of a very numerous collection of British birds, has an adult specimen of the ivory gull (*Larus eburneus*). Nothing could more aptly describe the colour of this bird than its name. It is intermediate in size between the herring and black-headed gulls.

By way of conclusion I may be allowed to notice that albino varieties of the stormy petrel sometimes occur. Mr. Miller has one which is altogether of a dirty white, except those parts which are white in the common variety, and which are here clearly distinguishable by their brightness. Mr. J. Smith of this place has also an albino variety ? of the furze chat (*Saxicola Rubetra*), and I have seen specimens of the common grey linnet nearly white.—Thos. Paine, Jun.

ON THE INSTRUMENTS OF PERFORATION IN THE *CICADA*.

M. Doyère has published some remarks on the ovipositor of the *Cicada*, 'Ann. Sc. Nat.' t. vii. p. 193. tending to show that Reaumur's notion, according to which the perforation is effected by the up and down motion of the two lateral parts which are serrated at their apex, and that the middle piece serves merely to hold together the side pieces, cannot be correct; as in the first place, the serratures of the lateral pieces are too blunt, and on the other hand, the whole instrument would want a point of support, as the whole weight would fall on the anterior portion of the body only. He therefore brings forward the view that the lateral pieces are employed rather as pincers and serve as a point of support to the borer, and that the process might perhaps be the following: the pincers are at each time inserted into the small aperture made by the middle piece, and these are then extended in such a manner that the middle piece, again advancing, forces them, after the manner of a wedge, one from the other. As the *Cicada*, according to Reaumur, only use withered twigs for piercing holes for their eggs, would the strength of the ovipositor be sufficient for this process?—Erichson's *Report on Entomology in Wiegmann's Archiv*, Part V. 1838.

OCCURRENCE OF *CAREX RUPESTRIS*, WAHL.

I was so fortunate as to discover this very rare plant on the edges of rocks at Inchnadamff, Sutherlandshire, in the early part of September 1838, growing with *C. capillaris* and *Dryas octopetala* at an inconsiderable elevation.—Charles Churchill Babington.

BLACK VARIETY OF THE COMMON HARE.

At a recent meeting of the Cambridge Ray Club a specimen of the alpine swift, *Cypselus alpinus*, Temm., which had been killed between Cambridge and Granchester in September 1838, was exhibited by its possessor Mr. C. Sawle; and at another meeting the Rev. J. J. Smith exhibited a totally black variety of the common hare lately shot at Shortgrove in Cambridgeshire.—C. C. B.

The death of Mr. Hunneman, who has for a very great number of years transacted, in the most prompt and liberal manner, the business concerns connected with the purchase and transmission of books and parcels of so large a portion of naturalists both of this country and the continent, will be long and severely felt. But it is with great pleasure we can announce, that Mr. Wm. Pamplin, Jun., botanical bookseller of Wandsworth Road, London, (and now also of No. 9, Queen Street, Soho,) has succeeded Mr. Hunneman in this department. We have the pleasure to know Mr. Pamplin personally, and are well acquainted with his punctual business habits, his great steadiness of character, his obliging manners, and his ardent attachment to natural history in general and to botany in particular; and we can with confidence recommend him as a worthy successor to our lamented friend. We have reason to believe that circulars, containing further particulars, will at once be issued by Mr. Pamplin, and we know that he will have the advice and assistance of Mr. Hunneman's family in the first outset of his transactions.—W. J. H.

METEOROLOGICAL OBSERVATIONS FOR FEBRUARY, 1839.

Chiswick.—Feb. 1. Overcast: fine: frosty at night. 2. Sharp frost. 3. Thawing: hazy. 4. Fine: cloudy. 5. Hazy: heavy rain at night. 6. Foggy. 7. Drizzly. 8. Hazy: cloudy and windy at night. 9. Overcast. 10. Very fine. 11. Dense fog. 12. Fine: overcast: rain. 13. Fine. 14. Boisterous. 15. Clear. 16. Stormy and wet: fine. 17. Clear. 18. Snowing: sleet: clear. 19. Sharp frost. 20. Bleak and cold. 21. Cloudy and cold: dry haze: rain at night. 22. Hazy: rain. 23. Rain: very fine. 24. Very fine. 25. Clear: showery: fine. 26. Clear and frosty: fine. 27. Fine. 28. Very fine.

Boston.—Feb. 1. Fine. 2. Cloudy. 3. Cloudy: rain early A.M. 4, 5. Fine: rain P.M. 6. Cloudy. 7, 8. Fine. 9. Fine: rain P.M. 10. Fine. 11. Cloudy. 12, 13. Fine. 14. Stormy. 15. Fine. 16. Cloudy: rain early A.M. 17—19. Fine. 20, 21. Cloudy. 22. Cloudy: snow early A.M. 23. Cloudy: rain early A.M. 24. Fine. 25. Fine: hail and snow P.M. 26. Fine. 27. Cloudy. 28. Fine.

Applegarth Manse, Dumfries-shire.—Feb. 1. Clear day: ground covered with snow. 2. Cloudy: gentle thaw. 3. Moderate thaw: snow melting slowly. 4. Moderate thaw: small rain evening. 5. Thaw continuing: snow melting. 6. The same: very temperate: rain P.M. 7. Stormy day: snow gone: very wet. 8. Quiet A.M.: wind rose P.M.: wet. 9. Rain: dark and cloudy: mild. 10. Fair and mild: threatening P.M. 11. Raw cold: cloudy. 12. Fine day: flying hail showers. 13. Mild A.M.: rain and wind P.M. 14. Boisterous day: frequent hail and sleet. 15. Tolerable spring day: wet P.M. 16. Showers of snow: high wind. 17. Snow half an inch deep: frosty. 18. Moderate day: snow melting: freezing. 19. Fine frosty day: getting cloudy P.M. 20. Favourable day: slight snow. 21. Hard frost: cloudy: slight snow P.M. 22. Thaw: snow preceding night: snow melts. 23. Very fine day: temperate and spring-like. 24. On the whole mild: occasional showers. 25. Moderately temperate: slight frost A.M. 26. Fine day though rather chill. 27. Severe showers of sleet: cleared up P.M. 28. Occasional slight showers.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. ROBERTON; *by* Mr. THOMPSON *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. VEALL *at Boston, and by* Mr. DUNBAR *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1839. Feb.	Barometer.						Thermometer.									Wind.				Rain.				Dew-point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc. Self-register.			Chiswick.		Boston. 8½ a.m.	Dumfries-shire.			London: Roy. Soc. 9 a.m.	Chiswick 1 p.m.	Bost.	Dumfries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	8½ p.m.	Fahr. 9 a.m.	Max.	Min.	Max.	Min.		9a.m.	9p.m.										
1.	30·008	30·121	30·067	29·73	30·17	30·13	29·7	33·8	26·8	36	20	27	23	24		NW.	N.	calm	SW.	·050	...	...	...	25
2.	30·076	30·130	30·101	29·70	30·05	29·90	32·5	35·3	30·0	41	29	31·5	28	35		NW.	NW.	calm	SW.	·038	...	...	...	26
3.	29·868	29·910	29·875	29·50	29·82	29·78	37·4	38·3	32·7	45	29	35	32½	34½		S.	SW.	W.	SW.	·038	·42	·09	...	30
4.	29·822	29·866	29·850	29·44	29·70	29·58	38·7	39·3	36·6	49	33	33	33	40		SE.	S.	calm	SE.	...	·12	...	...	32
5.	30·104	30·165	29·974	29·69	29·97	29·98	41·8	48·8	38·3	46	36	37	36	34½		W.	S.	calm	SE.	·088	·39	·10	1·05	34
☾ 6.	30·122	30·232	30·119	29·81	30·12	29·84	39·3	45·3	40·0	50	42	39	35	39		N.	SE.	calm	SE.	·377	...	·12	...	35
7.	30·288	30·336	30·298	29·80	30·11	29·86	47·8	48·7	39·9	53	48	47	36	45		SSE.	SW.	calm	S.	...	·01	...	...	38
8.	30·360	30·373	30·304	29·82	30·15	29·90	48·6	49·4	47·9	53	49	47	38	45		S.	SW.	calm	S.	...	...	...	...	46
9.	30·342	30·351	30·327	29·69	29·84	30·11	50·7	51·8	47·9	53	39	53	45	43		SW.	SW.	calm	S.	...	·06	...	...	44
10.	30·476	30·559	30·280	29·92	30·36	30·36	43·8	44·0	43·9	53	28	41·5	34½	41		NW.	NE.	calm	SSW.	·091	...	·05	...	40
11.	30·462	30·485	30·371	29·92	30·24	30·08	41·4	42·0	37·9	49	41	37	43	43		S.	SW.	W.	SSW.	...	...	...	...	40
12.	30·300	30·326	30·261	29·75	30·10	30·18	45·9	48·8	41·2	48	31	43	45	36		S.	SW.	W.	NW.	...	·04	...	...	41
13.	30·488	30·385	30·315	29·97	30·25	29·91	40·7	48·8	38·2	51	38	36	38	41½		SW.	W.	calm	SW.	·061	...	...	...	40
● 14.	29·910	30·083	29·934	29·29	29·50	29·80	48·0	48·7	40·6	53	31	49	45	35		S.	W.	W.	W.	...	...	...	0·24	40
15.	30·104	30·109	29·873	29·54	29·81	29·50	39·3	52·3	36·4	51	40	37	37	42		sw var.	W.	calm	SW.	...	·14	...	...	37
16.	29·520	29·554	29·553	29·08	29·27	29·28	43·3	49·2	39·3	47	32	41	34	33		NW.	W.	calm	SW.	·055	...	·12	...	41
17.	29·494	29·504	29·467	29·05	29·30	29·32	35·8	45·0	34·2	46	26	34	31	31		S.	W.	calm	NW.	...	...	...	...	32
18.	29·464	29·686	29·474	29·15	29·65	29·70	37·3	37·8	34·2	38	23	31·5	33	30		S.	W.	calm	E.	·055	·30	...	...	35
19.	29·590	29·639	29·452	29·25	28·66	28·58	32·8	38·3	30·5	40	30	31	28½	34		NW.	SE.	calm	N.	·033	...	...	...	29
☽ 20.	29·374	29·944	29·394	29·20	28·86	30·25	38·3	39·6	32·4	39	34	37	34	28½		NE.	NE.	E.	SW.	...	·14	...	...	33
21.	30·238	30·274	30·214	29·90	30·24	29·82	35·9	39·8	35·0	42	32	36	27½	32		NE.	NE.	E.	SW.	...	·20	...	...	23
22.	29·836	29·875	29·728	29·43	29·60	29·55	42·4	43·3	34·9	51	41	37	38	37		S.	W.	W.	W.	·116	·24	...	...	36
23.	29·544	29·822	29·559	29·09	29·51	29·64	49·8	50·9	43·0	52	31	43·5	37½	36½		s var.	NW.	calm	W.	·283	·03	·51	...	40
24.	29·810	29·828	29·657	29·34	29·70	29·60	38·6	51·3	35·4	51	34	38	36½	32½		W.	W.	calm	W.	...	·04	...	0·28	35
25.	29·672	29·961	29·682	29·21	29·60	29·50	38·8	47·6	36·3	51	29	37	35	34		W.	NW.	NW.	W.	...	·06	·02	...	35
26.	30·028	30·052	29·966	29·49	29·95	29·80	35·2	44·8	33·7	43	26	33	32	39		W.	W.	NW.	W.	·052	...	·09	...	32
27.	29·866	30·000	29·863	29·40	29·64	29·82	41·2	42·4	35·2	51	31	36	38	35		S.	W.	NW.	SW.	...	...	...	...	33
○ 28.	30·176	30·196	30·159	29·70	29·98	29·95	39·3	46·5	35·7	52	40	38	39	42		SW.	W.	calm	SW.	...	...	...	...	32
Mean.	29·977	30·070	29·932	29·53	29·81	29·79	40·5	44·7	37·1	47·64	33·67	38	35·4	36·5						Sum. 1·337	2·19	1·10	1·57	Mean. 35·0

ANNALS OF NATURAL HISTORY.

XV.—*On two British Species of* Cydippe. By Edward Forbes, Esq.

[With a Plate.]

When walking along the sandy shore at St. Andrews' on Saturday the 28th of December, 1838, in company with my friend Mr. J. Goodsir of Anstruther, our attention was directed to a number of small, shining jelly-like globes which were thrown up by the sea and rolled back on the receding of the waves. On gathering some we were delighted to recognise them as species of *Beroë*, and on placing the creatures in sea-water were greatly astonished and pleased by their elegant appearance and lively motions. They were kept alive for several days: imperfectly known as these animals are, the following remarks may prove of some importance in illustrating their natural history. As every precaution was taken, and the observations of several persons carefully compared, whilst sketches were made at the time from the specimens (more than twenty) collected, I trust they may prove deserving of confidence.

The animals found at St. Andrews' belonged to the genus *Cydippe* of Eschscholtz, *Pleurobrachia* of Fleming: two different species occurred, the character and structure of which I shall first describe.

1st species—ciliferous ridges broad, commencing near the anus and extending over two-thirds of the body; rows of cilia on each ridge 19 or 20, 3 to 7 cilia in each row; lateral filaments very long.

2nd species—ciliferous ridges narrow, extending over more than two-thirds the length of the body from near the anus; rows of cilia about 36, crowded; filaments moderate.

Both the species are about the same size, seldom exceeding three-fourths of an inch in length, though some specimens

were longer (especially when first caught), melon-shaped and not so broad as long. Sometimes they appeared a little longer than at others, but they never altered their forms in the manner reported of *Beroë cucumis* by Fabricius and by Dr. Macartney. The body of both is divided into eight longitudinal lobes, the furrows separating, which are deepest in the first species; on the summit of each lobe is a ciliferous ridge, not however continuous from mouth to anus in either case. The cilia when in motion are beautifully iridescent. The second species generally exceeds the first in size, and is slightly more elongated, but is comparatively a sluggish animal. The cilia of the first are very large compared with those of the second, and consequently the first species is much more lively in its motions. It is also a much less delicate animal, bearing transportation with comparatively little injury.

It swims by striking the rows of cilia exactly as a fish strikes the water with its pectoral fins: sometimes it moves them slowly, sometimes extremely quick, sometimes when in motion, and sometimes when at rest. At times the animal seems quite quiescent, but the least motion in the water excites it to move its cilia. It always strikes the cilia towards the anal extremity, and in no instance did either species swim with that extremity forwards. At the anterior end of the animal is the mouth, which contracts and dilates irregularly, and occasionally pouts out, when it appears lobed. The mouth opens into a cavity or stomach, slightly contracted superiorly, and extending more than half-way into the centre of the animal. This stomach contracts and dilates also irregularly and is lobed. When contracted, the folds appear as if coloured (purplish), and are apt to mislead the observer into the notion that they are separate organs or vessels in the stomach, which however when dilated presents no trace of them. Near the base of the stomach is a translucent brownish tongue-shaped organ of some size, the nature of which I cannot guess. It has the power of changing form, sometimes lengthening and at other times contracting. It does not extend altogether to the base, but appears to terminate in four hooked-shaped processes, which are lodged in what seems the bilobed extremity of the stomach. From the end of the stomach there is a very

small canal proceeding to the other extremity of the animal, and opening in the little funnel-like cavity of the anus. At about one-fourth the length of the animal on each side the anal half are the openings of the two filamental cavities. Each cavity is a *cul-de-sac*, in which a long filamental arm is lodged, attached to a triangular process projecting from the inner side of the base. The filaments are not rolled spirally, but packed irregularly in the cavities, and are jerked as it were out of the body by their contraction. In the first species the filamental cavity is shorter, though wider than in the second, but the filaments themselves are much longer. Each filament is furnished on one side with a number of small filaments coiled spirally like the tendrils of a pea. When the main filaments are ejected from the body the little filaments begin to uncoil, not simultaneously, but separately, those about the centre generally uncoiling first. The two main filaments appear to be tubular. They are not ejected from the body simultaneously, at least in all my specimens they were sent out alternately.

On making sections of the animal we find the following appearances. The stomach is compressed laterally and four-lobed, the two cross lobes being smallest; the filamental cavities are cordiform towards the base in consequence of the projecting pedules of the filaments. From the basal angles of each filamental cavity proceed six canals, two to the stomach, meeting at the extremity of the cross lobes, and four to the ridges of cilia. Two of the latter and one of the former canals meet at each of the basal angles. The canals to the ciliferous ridges probably communicate with longitudinal canals at their bases. The rest of the body is homogeneous and solid. Round the mouth is a white thread-like circle, but I could observe no filaments branching from it: it is not connected with the terminations of the ciliferous ridges. This circle, judging from analogy, is probably nervous.

When an individual of either species is placed in a vessel of sea-water, it often projects its long filaments upwards, itself resting at the bottom of the vessel. At other times it darts upwards with great velocity, drawing its long filaments after

it, retracting and extending them alternately. They seem to guide it in its course. Not unfrequently it remains some time at the top of the water; and when it wishes to descend, turns over, drawing up its filaments suddenly, and then swims mouth downwards to the bottom of the vessel.

Imbedded in the substance of one of these animals, near the stomach, is a remarkable parasitic worm, in shape resembling a *Filaria*. The only specimen in which the parasite was found is now preserved in Mr. Goodsir's collection.

The comparison of the two species of *Cydippe* here described induces me to regard the filamentary cavities and the filaments themselves as the generic points of their organization; while the number of rows of cilia, the length of the ciliferous ridges, and the relative proportions of the various parts of the animals afford good specific distinctions. The character of the genus given by Blainville, 'Actinologie,' p. 148, abounds in errors, being founded on the imperfect observations and rude sketches (chiefly of travellers) published before his book came out. Thus the filaments are represented as proceeding from the mouth, and the body of the animal as divided into eight lobes by the ciliferous ridges, whereas the ridges are really placed on the summits of the eight lobes. The fragility of the animals and the unfavourable circumstances under which they have generally been observed easily account for these mistakes. The observations of Otho Fabricius on this *Beroë ovum* (*Mertensia ovum*, Lesson), of Dr. Fleming on his *Beroë ovatus*, 'Wern. Mem.' iii. 401, and of Dr. Grant on *Cydippe pileus*, 'Zool. Trans.' vol. i. are most important of any on this tribe of animals.

Lesson, in his 'Mémoire sur la Famille des Beroides,' (An. Sc. Nat. 1836), divides the genus *Cydippe* into three genera; *Eucharis*, Eschscholtz; *Cydippe*, Eschscholtz; and *Mertensia*, Lesson. Of *Cydippe*, to which both the species I have described belong, he enumerates two species, *Cydippe pileus* and *Cydippe densa*, the latter a Mediterranean animal having red filaments. The only recorded British species is the *Beroë pileus* of authors, *Pleurobranchia pileus* of Fleming, *Cydippe pileus* of Eschscholtz, Blainville, and Lesson. To it the first

of the two animals I have described probably belongs: the second, as far as I know, is undescribed, and new to the British Fauna.

Yet if the first be the *Beroë pileus*, Professor Grant's animal, judging from his elaborate figure and the appended description, must either be distinct, or has been incorrectly observed. I am inclined (with all due deference to that distinguished naturalist) to the latter opinion, for the following reasons:

1st. In Professor Grant's figure the filamentary cavities, instead of opening at the anal, open at the oral end of the animal. Imperfect as most of the older figures are, they represent the filaments coming out at the anal end, as they do in the two species I have described. It is not likely so important a part of the animal's organization should be reversed in so remarkable a manner.

2nd. The ovaries are represented where the filamentary cavities are placed in my animals. When the *Cydippe* is at rest with its filaments withdrawn, the cavities at first glance appear filled with ovaries, and as such I noted them on the seashore under the impression that the animal was a true *Beroë* before I saw it protrude its filaments. Is it not possible that many of the so-called species of *Beroë* may be species of *Cydippe* with the filaments packed up in the cavity? The second species did not send out its filaments for a long time after being placed in sea-water, and even then rarely. If Professor Grant's figure be correct, the eggs must be imbedded in the solid substance of the animal; but it is much more likely that the long filaments are analogous to the ovigerous filaments of the *Diphysa* and other allied animals, and that in the proper season the eggs are developed in the filamentary cavities. The filaments when ejected are plainly seen to proceed from their pedicles at the bases of their cavities, and not merely from the mouths of the cavities as represented in Professor Grant's figure.

I have little doubt as to Dr. Fleming's *Beroë ovatus* being a *Cydippe*, judging from the imperfect figures in the 'Wernerian Transactions,' vol. iii.

3rd. The filamentary cavities in Professor Grant's figure

are curved with a sigmoid flexure *towards* the stomach; in both the species examined the curve is but slight and always *from* the centre of the animal.

The ridges of cilia are represented by Professor Grant as extending the whole length of the animal from mouth to anus. This probably indicates a difference of species. The rows of cilia do not appear to me to be webbed, especially in the second species; and when in motion, it seemed as if the lateral cilia in each rows moved before the central, thus causing an undulating appearance and a play of colours. I could not observe the filaments branching out from the nervous circle as figured by Professor Grant.

The whole structure of the animal examined conveyed the idea of the bilateral rather than of the radiate type, and tended to confirm the opinions of M. Blainville on that subject.

M. Blainville's character of *Cydippe* might be amended thus:

Body regular, free, gelatinous, oval, divided into eight lobes, each crowned by a ridge furnished with transverse rows of vibratile cilia.

Mouth opening into a compressed and 4-lobed stomach, from which a canal proceeds to the anus. A cavity on each side of the centre opening towards the anal extremity and containing a long semipinnated retractile filament.

REFERENCES TO PLATE II.

1. Cydippe No. 2.
2. Cydippe No. 1.
3. Diagram of stomach and filamentary cavities.
4. Section showing vessels.

XVI.—*Descriptions of some new or rare Indian Plants.* By G. A. W. Arnott, Esq., LL.D.

[Continued from p. 92.]

Lophopetalum, Wight, MSS. (*Celastrineæ*).

Calyx scutelliformis 4—5-lobus, lobis rotundatis brevibus. *Petala* 4—5 sessilia orbiculata patentia, supra circa basin cristis lobulisque carnosis instructa versus marginem nuda lævia. *Torus* discoideus, 4—5-gonus crassus carnosus calycis cavitatem omnino implens.

Stamina 4—5, petalis alterna, supra discum inserta: filamenta persistentia subulata. *Antheræ* ovatæ, biloculares, longitudinaliter dehiscentes. *Ovarium* disco semi-immersum, 3—4-loculare. *Ovula* biserialia, 8—12 in quoque loculo, adscendentia. *Stylus* brevis persistens. *Stigma* obtusum. *Capsula* 3—4-angularis, 3—4-locularis, loculicide dehiscens, loculis subdispermis. *Semina* arillata.

Fructices *glabri*. Folia *opposita, petiolata*. Flores *magni, corymbosi*.

1. *L. Wightianum* (Arn.); foliis elliptico-oblongis paullo acuminatis basi obtusis integerrimis, corymbis terminalibus paniculatis, floribus pentameris, ovario 3-loculari. *Wight. Cat.* n. 2440.

Hab. in Malabaria, *Wight*.

Flores 6-8 lineas lati. Petala pallide sulphurea. Discus sanguineus, angulis protuberantibus rotundatis, petalorum bases incumbentibus.

2. *L. grandiflorum* (Arn.); foliis subovalibus obtusis basi acutis serratis, corymbis axillaribus folio brevioribus, floribus tetrameris, ovario 4-loculari.—Evonymus grandiflorus. *Wall. in Roxb. Fl. Ind.* (ed. Wall.) ii. p. 404; *Cat.* n. 4282.—E. lucidus. *Don, Prod. Fl. Nep.* p. 191. *DC. Prod.* ii. p. 4.

Hab. in Nepala, *Wallich*.

Flores 10 lin. lati. Petala (fide Wallich) alba. Discus atroviridis, quadratus.

I am unwilling to change the specific name of this species, as it has been already fully described under it by its distinguished discoverer, but the flowers are scarcely larger than those of the other species.

Microtropis, Wall.

Sepala 5, orbiculata, 3 interiora, 2 exteriora, imbricata. *Corolla* hypogyna, gamopetala, carnosa, 5-partita, laciniis oblongis concavis erectis intus carina longitudinali instructis, deciduis tubum carnosum annuliformem circa ovarium relinquentibus: æstivatio imbricativa. *Stamina* 5, brevia, corollæ tubo inserta, laciniis alternantia. *Filamenta* subulata glabra. *Antheræ* cordato-oblongæ, dorso medio affixæ, biloculares intus longitudinaliter dehiscentes. *Squamulæ* 5, breves, epipetalæ staminibus alternantes, paullo inferius insertæ. *Discus* nullus (nisi tubo corollæ arcte coalitus). *Ovarium* liberum, brevissimum, biloculare, loculis 2-ovulatis. *Ovula* collateralia, adscendentia. *Stylus* conicus, carnosus, ab ovario externe haud distin-

guendus. *Stigmata* 4, punctiformia.—"*Capsula* oblonga, unilocularis, bivalvis, a basi dehiscens. *Semina* solitaria, arillo tenui succulento involuta. *Albumen* firmum tenax. *Embryo* erectus, cotyledonibus cordato-ovatis, radicula cylindrica, infera."—*Roxb.*

Arbor *elegans, glabra, habitu* Caralliæ. Folia *opposita, ovata vel ovato-lanceolata, obtuse acuminata, coriacea, integerrima, subtus pallida, tenuiter penninervia, petiolata.* Stipulæ *nullæ.* Pedunculi *axillares, vel supra-axillares ac interpetiolares, perbreves, semel bisve dichotomi, pauciflori.* Flores *brevissime pedicellati, pedicellis basi bibracteolatis.*

1. *M. discolor.* Wall. Cat. n. 4337.—Cassine discolor, *Wall. in Roxb. Fl. Ind.* (ed. Wall.) ii. p. 378.—Evonymus garcinifolius. *Roxb. Fl. Ind.* i. p. 628. (ed. Wall.) i. p. 404.

Hab. in Silhet.

The above character is derived solely from *M. discolor,* but Dr. Wallich, in his list of East India plants, indicates with doubt some other species. One of these, however, is *Celastrus bivalvis* of Jack, which has no petals, and must be very different.

The genus is only pointed out by Dr. Wallich, and is adopted by Dr. Lindley, in his 'Introduction to the Natural System', without a definition. Dr. Wallich, influenced probably by the gamopetalous corolla, originally united it with *Cassine,* which is now generally referred to *Ilicineæ*: Roxburgh inserted it in *Evonymus,* and described the petals as distinct: DeCandolle seems not to have been acquainted with it: Lindley places it without doubt in *Celastrineæ.* To me its affinities are not at first sight very clear. In the true *Celastrineæ* there is usually a large flat disk, covering the shallow bottom of the calyx and cohering with it; the petals are distinct, and the stamens, so far from being inserted on the petals, often arise from the middle of the upper surface of the torus or disk. In *Ilicineæ,* on the contrary, the petals are more or less united at the base, the stamens inserted on the tube, and there is no disk; from which considerations only one would have little hesitation in referring *Microtropis* to the latter family. But in *Ilicineæ* the ovules are solitary, the seeds exarillate, and the fruit indehiscent; so that in as far as relates to these organs this genus is more related to *Celastrineæ.*

After the fall of the segments of the corolla, its annular base around the ovarium, bearing on its inside the persistent filaments and scales, presents so much the appearance of a cup-shaped fleshy torus or disk (such as is to be seen in some species of *Celastrus*), that for some time I felt disposed to view it as such, and that the petals might be distinct and attached to the back or edge of this ring; but on examining several flowers in various stages I can perceive no trace whatever of an annulus, so long as the segments of the corolla were not broken off. There is therefore no distinct disk; but I am far from denying it a torus, and in a sense somewhat different from what usually exists in the Corolliflorae. In most of that group of orders the petals are soldered together by their margins, and the filaments of the stamens, although apparently epipetalous, are decurrent, and may have their insertion traced to the same point as that of the corolla; there is besides sometimes a hypogynous disk, or glands. In *Microtropis*, however, the stamens are not at all decurrent, and therefore it is not improbable that there is a disk or torus, with which the lower part of the petals is completely incorporated, and that the stamens and scales are inserted on the upper or inner surface of the disk. Under this point of view *Microtropis* might be left in *Celastrineæ*, and the principal objection to such would arise from the supposed torus being hypogynous, while in those species of *Celastrus* in which a cup-shaped torus is to be seen the torus is adnate to the bottom of the calyx, the margin only being free. In *Celastrineæ*, moreover, the tube of the calyx is shallow and broad, in *Microtropis* it is small, if indeed any can be said to exist, for the sepals appear almost quite distinct.

Nearly all the genera referred to *Celastrineæ* and *Ilicineæ* require careful revision, several of them being much at variance with the characters of the orders in which they are placed. Professor Lindley inserts all the section *Aquifoliaceæ* of De Candolle in one order, reserving *Celastrineæ* for the others. Mr. G. Don, in his edition of 'Miller's Dictionary, or General System of Gardening,' refers *Cassine*, *Nemopanthes*, and a few others of DeCandolle's *Aquifoliaceæ* to *Celastrineæ*, and *Myginda*, *Ilex*, *Prinos*, and some new genera of Blume's to *Ili-*

cineæ; but perhaps neither have weighed sufficiently the characters derived from the disk and position of the ovula. I am not aware of any genera that agree with the characters of *Ilicineæ*, as limited by Brongniart and now usually adopted, except *Ilex*, *Prinos* (with their synonyms or subgenera, *Winterlia*, *Macoucoua*, and *Ageria*), and *Mygindra integrifolia* (not however a *Mygindra*, that genus belonging certainly to *Celastrineæ*): to these *Rhaptostylum* approaches, and appears, from Kunth's description, principally to differ from them by the stamens being twice as many as the segments of the corolla. Nearly all the other genera enumerated by Lindley have the disk, distinct petals, and ascending ovula of *Celastrineæ*. *Lepionurus*, referred to *Ilicineæ* by Don, and to *Rhamneæ* by Lindley, having a monopetalous corolla, and the stamens inserted on it opposite to its lobes, has perhaps more affinity with *Myrsineæ*. *Strombosia*, Bl., with a perigynous disk, and stamens opposite to, and inserted on the petals, and *Leucoxylon*, with numerous stamens, must obviously be also excluded. *Nemopanthes* has solitary pendulous ovules in each cell of the ovary, no disk; and although the petals are distinct and unconnected with the stamens, must undoubtedly be joined to the *Ilicineæ*, while the character of the order on that account ought to be slightly modified. *Mylocaryum*, having ten stamens and other points of difference, cannot be placed, as proposed by Lindley, among *Celastrineæ*, as presently limited. As to *Olinia*, I had probably expressed myself too decidedly to Prof. Lindley when he refers it on my authority to *Celastrineæ*: my original memoranda merely bear, that from the position of the stamens it was more related to *Celastrineæ* that *Rhamneæ*, in which DeCandolle placed it; but I am now convinced, from an examination of three species, and of the fruit, which is inferior, that M. O. Klotzsch, of Berlin, is correct in associating it with *Myrrhinium* and *Fenzlia*: these three may form a small group (*Olinieæ*, or *Myrrhinieæ*, to prevent it being confounded with *Oleineæ*), intermediate between *Memecyleæ* and *Myrtaceæ*, but bearing more affinity with the latter: if *Memecyleæ*, as Brown suggests, be united to *Melastomaceæ*, then *Myrrhineæ* may form a section of *Myrtaceæ*.

Vateria, L. (*Dipterocarpeæ*).

In the 'Prod. Fl. Penins. Ind. Or.' i. p. 84, Dr. Wight and I pointed out how *V. lanceolata* of Roxburgh differed from the original species of the genus. Our remarks have been lately confirmed by the discovery of another species allied to, but distinct from *V. lanceolata*. I shall here therefore divide the genus into two sections or subgenera.

I. Euvateria.

Calycis laciniæ obtusæ, fructiferi immutatæ. Petala ovalia calycem vix superantia. Stamina 40—50 : antherarum loculi lineares. Stylus elongatus, stigma acutum.—Panicula magna, terminalis.

1. *V. Indica*, Linn. Wight et Arn., l. c.

II. Isauxis.

Calycis laciniæ ovatæ acutæ, fructiferi grandefactæ. Petala falcata, calyce triplo longiora. Stamina 15 : antherarum loculi oblongi. Stylus brevis, stigma clavatum, 3—6-dentatum.—Paniculæ axillares, folio breviores.

2. *V. lanceolata* (Roxb.) ; foliis lanceolatis basi acutis. *Roxb. Fl. Ind.* ii. p. 601.

Hab. in Silhet.

3. *V. Roxburghiana* (Wight Mss.) ; foliis oblongis basi retusis vel obtusis. *Wight, Cat.* n. 2448.

Hab. in Malabaria, *Wight.*

XVII.—*On the Goniatites found in the Transition Formations of the Rhine.* By M. Ernest Beyrich.

[With Plates.]

[Continued from p. 20.]

Section IV. Irregulares.

The dorsal lobe simple, infundibuliform. Two or more pointed lateral lobes, generally infundibuliform, increasing irregularly.

7. *Ammonites Hœninghausi*, Von Buch.

L. Von Buch Goniat. p. 40. Pl. II. fig. 2.

The dorsal lobe is somewhat broader than deep, the dorsal saddle angulose ; there are two lateral lobes ; the first is linguiform and twice the depth of the dorsal lobe. The first lateral saddle is narrow and elevated much higher than the dorsal

saddle. The second lateral lobe is but half the depth of the first; the second lateral saddle scarcely reaches the height of the dorsal saddle, and declines strongly towards the suture. The increase in height is 0·51; the increase in breadth 0·55. Nearly half the interior whorls are enveloped.

Besides the fragment in the Museum of Bonn, there is a more complete and better preserved specimen of this ammonite to be found in the collection of Dr. Hassbach of Bensberg. According to his assertion, it came from the transition limestone near the quarry (Steinbreche) not far from Bensberg, that is to say, from a limestone identical with that of the Eifel.

8. *Ammonites multiseptatus*, Von Buch.

L. Von Buch Goniat. p. 42. Pl. II. fig. 13.

The dorsal lobe is small, its breadth and depth nearly equal. Of the four lateral lobes the first is three times the depth of the dorsal lobe, the second is the deepest, the third and fourth are smaller, and there is the commencement of a fifth. The lateral saddles as well as the dorsal saddle are broad and rounded; the second of them is most elevated. The increase in height is 0·53; the increase in breadth 0·48. There are fifty-six chambers in one whorl.

Of this ammonite, which is well characterized by the form of the lobes and number of the chambers, we know at present only a fragment in the Museum at Bonn. It is changed into pyrites, and may very probably belong to the transition limestone of the Eifel, where pyritose fossils often occur.

9. *Ammonites multilobatus*, n. s. Pl. I. fig. 9.

Upon the flat and smooth side are six and sometimes even seven lateral pointed lobes; the first five from the back become gradually deeper; the fifth is the deepest; after that follows a sixth, much smaller, and probably also a seventh. The lateral saddles are pointed; the fifth is the most elevated. The form is discoid, the back very narrow, and rounded off at its junction with the flat sides. On account of the number of lobes and the great difference of form between this and all the other Goniatites, I have thought it right to establish it as a species, though I possess but an insignificant fragment from

the red limestone of the Oberscheld. Neither the increase of the height or breadth can be determined from this fragment, the breadth of the side upon the portion of the fragment preserved, amounts to nearly an inch and a half, so that this ammonite must have been of very considerable size. The fourth dorsal saddle is situated nearly at the middle of the side.

The following Goniatites belong to the fourth section; they are from the Fichtelgebirge, *A. contiguus*, *A. speciosus*, *A. subarmatus*, and *A. spurius*, Münster, probably also *A. maximus*, of which the lobes are not yet known.

Section V. Primordiales.

The dorsal lobe is divided. There is but one lateral lobe, which is generally rounded; more rarely pointed, its ventral side is raised quite to the suture, without bending itself round to form a lateral saddle.

10. *Ammonites æquabilis*, n. s. Pl. II. fig. 1. *a*, *b*.

The dorsal lobe is more than twice as broad as it is deep. The two sides in consequence rise very gradually to the dorsal saddle. The middle elevation which separates the two divisions of the dorsal lobe is rounded above, does not even attain half the height, and is somewhat hollowed near the siphuncle. The dorsal saddle is broad and rounded, and extends forward as far as the middle of the side; the lateral lobe is nearly as broad as the dorsal saddle and descends somewhat deeper than half the height of the dorsal lobe; its ventral side ascends rapidly towards the suture, to an equal height with the dorsal saddle. The increase in height is 0·7, the increase in breadth 0·75. The number of whorls is from five to six, half the innermost ones being enveloped. The height increases more slowly in this ammonite than is generally the case with Goniatites. The breadth also increases slowly, so that the form is very discoid. The outer whorls are but little elevated above the inner ones, which are nearly half enveloped; on this account they lie together, forming almost an even surface. The greatest thickness is at the middle of the side, which abates gradually towards the back and towards the suture. The back is rounded; the shell thick, presenting faint

traces of striæ. This ammonite is found with the Goniatites of the red limestone at Sessacker near Oberscheld.

11. *Ammonites carinatus*, n. s. Pl. I. fig. 11. *a*, *b*, *c*.

The dorsal lobe is nearly three times as broad as it is deep, consequently the two sides rise very gradually to the dorsal saddle, the middle elevation of the dorsal lobe is broad, rounded above, and reaches to about half the height of the lobe. The dorsal saddle is very broad and rounded, and reaches much beyond half the side. The lateral lobe rounded below rises towards the suture, but only to about half the height of the dorsal saddle. The increase in height is 0·45, the increase in breadth 0·57. There are five or six whorls, the inner whorls being almost wholly enveloped, leaving a narrow and deep umbilicus.

The lobes of this ammonite present a great resemblance to those of the preceding species with which it occurs. The only difference is, that in consequence of the still greater breadth of the dorsal lobe and dorsal saddle the latter extends further over the side, and the ventral wall of the lateral lobe is less raised towards the suture. The last character may arise from the inner whorls being here more strongly involuted, and in consequence a part of the lateral lobe may be compressed by the suture above. The septa of the chambers are hollowed to form a straight and deep ventral lobe at the part where they come in contact with the back of the preceding whorl. This ventral lobe is accompanied by two broad and smooth auxiliary lobes, which occupy the side of the preceding whorl, in the part which is enveloped. The greatest thickness is near the suture, from whence the side very gradually declines towards the back. On the middle of the back, if the shell is preserved, a small elevated ridge is visible, which is unusual in the Goniatites, and can only be produced by the siphuncle, situated immediately beneath the shell. This ridge cannot be seen if the shell is wanting, nor is it found on the unchambered part of the shell; on that part the back is altogether rounded.

In the specimen represented the unchambered part is entirely wanting. The complete ammonite is many inches in diameter. The shell thick and almost quite smooth.

12. *Ammonites intumescens*, n. s. Pl. II. fig. 2, *a*, *b*, *c*.

The dorsal lobe is rather less broad than deep, the sides ascending rapidly to the dorsal saddle. The elevation in the middle reaches to at least half the height of the lobe. The dorsal saddle has much greater height than breadth, occupies the middle of the side, and declines rapidly towards the lateral lobe; this is almost as deep as the dorsal lobe, is angulose, and its ventral side raised, at first rapidly and afterwards more gradually, towards the suture, almost to half the height of the dorsal lobe. The increase in height is 0·45, the increase in breadth 0·5. Of the five or six whorls the inner ones are almost wholly enveloped, so that only a narrow and deep umbilicus remains. This ammonite is found with the two preceding at Sessacker, near Oberscheld. In its form it bears some resemblance to *A. carinatus*; it is, however, thicker and less discoid, for with a similar increase in height it has more rapid increase in breadth. The lobes moreover sufficiently distinguish it. The greatest thickness is found towards the suture, the sides decline somewhat rapidly towards the back. The unchambered part is wanting in the specimen represented. The complete ammonite must have a diameter of at least four inches.

13. *Ammonites orbiculus*, n. s. Pl. I. fig. 12, *a*, *b*.

The dorsal lobe is twice as broad as it is deep, and its sides gradually ascend to the dorsal saddle. The middle elevation reaches to half the height. The dorsal saddle is broad and rounded, and occupies at least three-fourths of the side; its breadth is greater than its height. The lateral lobe is angulose, and almost the same depth as the dorsal lobe; its ventral side wall ascends towards the suture, but only reaches to about half the height of the dorsal saddle. The increase in height is 0·47, the increase in breadth 0·56. The inner whorls are almost entirely enveloped, forming a narrow and deep umbilicus.

This ammonite has been found in the state of pyrites in the environs of Gerolstein. The only specimen that I am acquainted with, now figured and described, is in the collection of M. Zehler at Crefeld. It is peculiarly interesting, as the

only example at present known of a Goniatite with divided dorsal lobe from the limestone of the Eifel. It has in common with the preceding species its lateral lobe pointed, in its form it approaches nearer to *A. carinatus*, but is sufficiently distinguished from both. The unchambered part of this ammonite must be imagined, as the whole of the fragment preserved is chambered.

14. *Ammonites calculiformis*, n. s. Pl. II. fig. 3, *a*, *b*, *c*.

The dorsal lobe is almost as broad as deep, its sides ascend rapidly to the dorsal saddle. The middle elevation does not reach one fourth the height of the lobe. The dorsal saddle is broad, rounded, and occupies half the side. The lateral lobe is also greatly rounded, and does not reach the third part of the depth of the dorsal lobe. Its ventral side ascends towards the suture nearly to the height of the dorsal saddle. The increase in height is 0·5, the increase in breadth 0·57. There are five or six whorls, the inner ones entirely disengaged. This ammonite is found with the Goniatites of the red limestone of Sessacker, near Oberscheld. From its form it might be taken for a *Clymenia*, rather than a Goniatite. In the inner whorls the flattened back forms a right or rather a sharp angle with the side, from the greatest thickness being immediately near the back, and the side descending to form an inclined surface somewhat concave from the back to the suture. The back is singularly excavated, so that a wide shallow furrow runs along it. On the last whorl but one the back is broader than the side. The sides of all the whorls are entirely exposed. Neither the sharp ridge formed by the back and side nor the furrow on the former appear in the last unchambered whorl. In this part the back is completely rounded, and the greatest thickness found in the middle of the side, rendering the section of the mouth very nearly circular. The shell is thin and very elegantly striated upon the last whorl, the striæ forming on the side and on the back a smooth curve directed backward. We must further remark that in this ammonite there is a deep ventral lobe, which sinks into the back of the preceding whorl, unaccompanied by the auxiliary lobes on either side. Among the species already described only the

A. primordialis, Schl., belongs to this fifth section. It occurs with other species partly appertaining to this section in the transition limestone of the Hartz, near Grund; strata which have great resemblance to the limestone of the Eifel, if not altogether identical with it. As the limestone of the Goniatites of Oberscheld is probably yet more recent than the limestone of the Eifel, it appears that we may lay down this rule, that the Goniatites of this section belong only to the recent transition limestone in the neighbourhood of the carboniferous limestone. Notwithstanding the great analogy that exists between the lobes of this and those of the following section, it is interesting to perceive that we can establish for the Goniatites of the carboniferous system a difference in the lobes not very important, but nevertheless very constant.

Section VI. Carbonarii.

The dorsal lobe is divided, only a single, lateral, angulose lobe, and one lateral saddle, large and rounded.

15. *Ammonites sphæricus*, Mart.

A. carbonarius, *Goldf.*, *L. von Buch Goniat.* p. 44. Pl. II. fig. 9 to 9^{iv}.

The dorsal lobe is about as broad as deep. The middle elevation does not reach half the height of the lobe. The dorsal saddle, as well as the two saddles of the middle elevation, form, in uniting above, an obtuse angle. The lateral lobe is single, small, not much deeper than the dorsal lobe, but has rather more breadth than depth. The lateral saddle inclines very gradually towards the suture; it is as high as the dorsal saddle and broader than the lateral lobe. The increase in height is 0·65 to 0·72, the increase in breadth 0·7. There are fourteen chambers in one whorl. The inner whorls are almost entirely enveloped, leaving an umbilicus of greater or less circumference.

Between the *A. sphæricus*, Mart., and *A. carbonarius*, Goldf., there is no specific difference with regard to the form or the lobes. One may observe all the gradations from the spherical form to those with a large and deep umbilicus. If there is a difference in the two, it is only to be sought in the quality of the shell and in the great number of the folds, which in *A. car-*

bonarius, even when the shell is wanting, are visible like ribs on the casts. This occurs in those individuals which were formerly found in the mine Hoffnung, near Werden, and to which Goldfuss specially gave the name *carbonarius*. The pyritose ammonites which are found in the state of pebbles in the Ruhr, as well as those of the carboniferous limestone, properly so called, of Visé, are casts upon which the lobes are very well preserved, though nothing of the structure of the shell can be perceived. The lobes of *A. sphæricus* are distinguished from those of the other Goniatites of the carboniferous strata by the dorsal saddle, which, as well as the two saddles of the middle elevation of the dorsal lobe, are not rounded, but on the contrary angulose. *A. sphæricus* is not met with among the ammonites found in the aluminous schist near Choquier.

16. *Ammonites Listeri*, Mart. Pl. I. fig. 13, *a*, *b*.

The dorsal lobe is nearly equal in breadth and depth. The middle elevation attains half the height of the lobe: the two saddles are rounded, as is also the dorsal saddle; the lateral lobe is nearly as deep as the dorsal lobe; it has, like the last, its two arms sloping towards the lower part, in the form of a tongue. The back, which is broad and rounded, forms a sharp ridge with the side, which descends rapidly towards the interior, and cuts across the lateral saddle in the middle. This latter is of the same height as the dorsal saddle. The increase in height is 0·72, the increase in breadth 0·62. There are sixteen to eighteen chambers in one whorl. The inner whorls are strictly enveloped, even to the ridge which is between the back and the side, so that the sides form a large and deep infundibuliform umbilicus. On the back are large and elevated folds. *A. Listeri*, as it is figured Pl. I. fig. 13, is met with at Choquier in the aluminous schist supervening on the carboniferous limestone; it is found in rounded kidney-shaped masses, inclosed by the aluminous schist, which is almost entirely composed of ammonites. I am not at present aware that it has been found in the carboniferous limestone of the Rhine. With this ammonite the *A. Diadema* and *A. atratus*, Goldf., are also found at Choquier. In these the form of the lobes is entirely similar. The peculiar characteristic of *A.*

Listeri is the sharp ridge, which must be regarded as the limit between the broad back and side, and which intersects the lateral saddle at the centre. The ridges of the shell are strong and simple on the inner whorls; on the outer they become finer and finer, and are bifurcated at the commencement of the back. They are always perceptible as ribs even upon the casts. The folds are raised upon the dorsal ridge in the form of scales, so that it appears indented; and this is well described by the *series marginalis tuberculorum* that Martin gives in his characteristic. The number of ridges upon the third or fourth whorl is about thirty or forty. Their number rapidly augments in the last whorls. A remarkable and very interesting fact is, that upon the outer whorls the folds change their direction altogether. Upon the inner whorls, contrary to the general rule for Goniatites, they form a curve upon the back, of which the convexity is directed forward. This curve becomes more and more flattened, the folds keep for some time in a straight line, and at last resume the ordinary direction. The change in the direction of the folds is figured, Pl. II. fig. 8. It proves that no great importance should be attached to the direction of the striæ or folds of the shell in separating the Goniatites from the rest of the Ammonites.

17. *Ammonites Diadema*, Goldf. Pl. II. fig. 5, 6, 7.

The dorsal lobe is nearly equal in breadth and height. The middle elevation is rounded like the dorsal saddle. The lateral lobe is almost as deep as the dorsal lobe and somewhat sloped in the form of a tongue. The lateral saddle is broad and rounded, and declines gradually towards the suture. The increase in height is 3·52; the increase in breadth 0·62 to 0·65. The inner whorls are almost entirely enveloped, leaving a narrow and deep umbilicus. The form is rather discoid than globular; the shell finely folded. The name which Goldfuss has chosen for this ammonite may have been occasioned by the smooth furrows, which to the number of four or six upon the circumference of a whorl, run along on the back and side, at nearly equal distances. The direction of these furrows entirely follows that of the plications of the shell, notwithstand-

ing which they are only visible on the casts, being completely filled up by the shell. The shell is very delicately plicated on the outer whorls; the folds are but little raised, and leave very indistinct traces on the casts. They become certainly stronger on the inner whorls, without however being much elevated. The direction of the folds changes as described above, but the change commences further back, and we must retrograde at least one entire whorl to perceive it. The *A. Diadema*, as here represented, appears to differ totally from *A. Listeri* in the form and structure of the shell, yet we ought not to consider these ammonites as two different species, if we would rigorously follow the principle of uniting all those which are connected by a continuous passage. In fact all possible varieties of passage may be observed in these two ammonites; they are determined by the variations which arise in the increase in height and the increase in breadth, characters of great constancy in the Goniatites, but which here vary between very distant limits. The increase in height for *A. Listeri* is estimated at 0·72; it is a very gradual increase. For *A. Diadema* it is 0·52: these are the two extremes. The increase in breadth remains nearly equal in both. The passage of the form of *A. Listeri* into *A. Diadema* is influenced thus: by following the continually rapid increase in height the breadth of the back diminishes, and in consequence the ridge, which is perceived as forming the limit between the back and side, appears less and less evident. According as the back becomes more straight, and the sides which begin to appear become larger, the umbilicus is narrowed and the plications of the shell become at the same time more numerous.

18. *Ammonites atratus*, Gold. Pl. II. fig. 8. *a*, *b*.

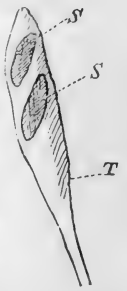
The dorsal lobe is a little wider than deep, the middle elevation reaches half the height of the lobe and is rounded, as is also the dorsal saddle. In the lateral lobe the breadth and depth are equal, the lateral saddle attains the same height as the dorsal saddle, and declines but little towards the suture. The increase in height is 0·4; the increase in breadth 0·55. The inner whorls are completely enveloped without umbilicus. This ammonite is found with the two preceding at

Choquier. It is entirely enveloped, the height increases rapidly, its form is in consequence very discoid, and this distinguishes it from *A. Diadema*, with which it must never be confounded. The shell is extremely thin and very finely striated and plicated. The folds, as far as I have been able to observe, present no change in their direction. The lobes agree in all their characters, as has been already remarked, with those of the two preceding species. It remains generally very small, being seldom more than three-fourths of an inch in diameter.

XVIII—*Remarks on the Reproductive Organs of the Lichens.* By George Dickie, Esq., A.L.S., Lecturer on Botany at Aberdeen.

Starch seems to be a product of almost universal occurrence in the vegetable kingdom; it is found in stems, roots, &c.; and in the parts of fructification of many plants, it is abundant, and appears to serve a very important purpose. It is plentiful in the disk of the almond, and Dunal has detected it in the disks of certain species of *Arum*; and it is supposed to undergo a certain change in order to render it fit to afford nourishment to the pollen and young ovules. Its presence in the ripe seed is well known, and its use during germination has been fully established. But starch is not confined to what are called the higher tribes of plants; it is also found in some which are generally allowed to stand low in the scale of vegetables. In 'Mag. Zoology and Botany,' vol. i. p. 382. I have stated that it occurs in the *nucules* of *Chara vulgaris*, and in the bodies, *formerly called capsules*, of *Pilularia globulifera*, in both of which it is also found along with a matter having all the properties of a fixed oil; it also occurs in those pyriform bodies which are found in the axillæ of the leaves of certain species of *Jungermannia*, 'Mag. Zool. and Bot.,' vol. i. p. 592. So that the bodies in the capsules of *Pilularia* are grains of starch and not sporules, and the contents of the anthers (of some authors) of *Jungermannia* consist also of the same substance. The bodies, which are found in the tubes (transversely undulated

filaments of Greville), contained in the globules of *Chara*, possess all the physical characters of starch globules; and although on account of their very small size I have been unable hitherto to ascertain satisfactorily the action of iodine upon them, still it is very probable that they are grains of fecula. The lichens which are placed still lower also contain starch, their thallus is the part to which it has been supposed to be confined, but even in this part it does not seem to be of universal occurrence, since I have been unable to detect it in the thallus of *Collema* and *Bœomyces* as specimens; however, if all the genera have not been tested, these are probably not the only two which do not contain it. But the reproductive organs of the lichens also contain a substance which is tinged blue by iodine. The thecæ or tubes which contain the sporules are the parts referred to.



The accompanying figure represents one of the thecæ (*t*) of *Pertusaria communis*; it consists of a fine transparent membrane, capable of being tinged blue by iodine, and containing in its interior a fluid matter in which the sporules (*s*, *s*) are immersed. Each sporule consists of a membrane similar to the thecæ, but not capable of being tinged blue by iodine like it. In the interior of each sporule there is a fluid in which numerous small globules are seen; they do not seem to possess any constant form. It has been already remarked, that iodine does not strike a blue colour with the thallus of *Bœomyces* or *Collema*; in the latter however the thecæ are tinged by it, but in the former there is no blue colour produced in any part. If the action of iodine entitles us to infer the presence of starch, the thecæ of the lichens must be considered a peculiar modification of it. From the investigations of Raspail, it appears that each starch globule has the power of producing in its interior other smaller globules, and that these last are (at one period) attached to the inner parietes of the mother cell.

Perhaps the thecæ of a lichen may be considered as a globule of starch of a peculiar form, in the interior of which other globules are produced, the sporules namely. I have not

been able as yet to see any connexion of the sporules with the wall of the thecæ; they appear to float loosely in the fluid which surrounds them. If thecæ in a very young state were examined, some connexion might be found.

Some of the lichens are considered to be closely allied to certain forms of Algæ, and Raspail, in his Organic Chemistry, states his belief that the colours of many marine Algæ may be owing to a peculiar combination of iodine with starch; he also states that he has succeeded in tinging lichens with iodine so that they resembled some Algæ. I am not aware of any of the fungi which contain starch, in such a state, at least, as to afford a blue colour with iodine: now it has been already stated that the same is true regarding *Bœomyces*, and this genus has been considered to make a near approach to the fungi. Sir J. E. Smith compares the fructification of *Bœomyces roseus* to some minute *Helvella*.

XIX.—*Note on a Fossil Ruminant Genus allied to* Giraffidæ *in the Siwalik Hills.* By Capt. P. T. Cautley.*

When we look at the number of species of Proboscidan Pachydermata which swarmed in the primæval forests; when we see that in the present day nature appears to have left but solitary species to attest the gigantic form of primitive existence, the imagination naturally places before our eyes forms of corresponding magnitude in other genera; we picture to ourselves gigantic Ruminants and gigantic Carnivora only to be revealed by the remains which nature has placed in her own keeping to exhibit to inquiring man the wisdom of design and the systematic chain of organization established throughout the whole of the animal kingdom.

Amongst the Ruminants the discovery of the *Sivatherium giganteum* has most amply tended to prove the truth of this induction, exhibiting a ruminating animal bearing the same proportion to the rest of its genus as the Mastodon and Elephant do to that of the Pachydermata. Amongst the Carnivora we have the *Ursus Sivalensis*, an animal far exceeding in

* From the 'Journal of the Asiatic Society of Bengal,' No. 79, 1838.

dimensions its congener of the present period, or the *Ursus Spelæus* and bears of the German caves, with a species of hyæna at least one-third larger than that now existing. The reptiles also have their gigantic representative in an entirely new genus of the tortoise, for which we propose the generic name of *Megalochelys*, from the enormous proportions of its remains as yet discovered, and the size of its femoral and humeral extremities equaling those of the largest rhinoceros. The question, however, does not appear to be whether the animals of former periods were larger than those now existing, but whether the genera of larger animals were not more numerous? We appear to be gradually losing all the larger forms of the creation. The elephant and giraffe of the present period will in all probability share the same fate as the *Mastodon* and *Sivatherium* of former eras, and be only recognized in the proofs exhibited by the researches of the geologists.

Having discovered the type of a gigantic Ruminant amongst the fossils of the Siwaliks in company with the remains of the larger Pachydermata, and having at the same time proved the existence of the camel, with other numerous species of the cervine and caprine family of Ruminants, it was not by any means improbable that the present tribe of *Giraffidæ* should have its representative, so that the connexion of the chain of existing and fossil Ruminants might be still more perfect. The discovery of the *Sivatherium* and camel in conjunction, led to the probability of the existence of the giraffe, giving this genus the first position amongst the family of *Cervidæ*. The fossil now to be described appears to throw some light on the subject; and should further research tend to corroborate the contents of this paper, it will be interesting to remark on the co-existence of the Sivatherium, Camel and Giraffe with Quadrumana, Anoplotheria, Mastodons, and reptiles so closely resembling those of the present rivers, that it is not possible to discover, in their osteological pictures at least, any remarkable deviation from the type which has been left to us.

The remain which I wish to describe is the third cervical vertebra: it was cleared out of a block of sandstone, and as is usual in similar cases, is very perfect in all its parts and proportions, and sufficiently armed with processes for the pur-

pose of recognition and comparison. The dimensions are as follows:

Length in the barrel	7·8 inch.
Breadth in centre ditto	1·7 —
Depth ditto ditto	2·2 —

There are marked differences between this fossil and the corresponding vertebra of the existing camel, and in comparing them together the following appear to be the most worthy of notice.

In the fossil the oblique processes are much shorter and stouter than those of the camel, with articulating surfaces at a greater angle: the barrel of the vertebra is much longer: the hollows or depressions which appear directly under the anterior oblique processes, and the ridges radiating from the extremity of the spinous process towards the expanded surface of the posterior oblique processes so well marked in the camel, are altogether wanting in the fossil; the upper surface, with the exception of the spinous process, being altogether flat and unmarked.

On the inferior or lower side of the vertebra there is also a considerable difference, that of the camel being much curved and hollow, uninterupted by ridge excepting in the vicinity of the posterior extremity, where there is a knob or round process: in the fossil this knob is wanting, but in its place there exists a well-defined sharp ridge from one extremity to the other. The transverse processes of the fossil are imperfect, but the form and angle of departure from the barrel of the vertebra differs from those of the camel.

The foramina for the transmission of the vertebral artery are well defined in the fossil, the space between the entrance and exit occupying the central third portion of the whole length; a prominent well-defined ridge runs obliquely across the plane of the side, connecting the upper anterior oblique process with the lower and posterior extremity of the transverse process; a very marked peculiarity, which, with the position of the foramina, separates the fossil from the camel.

XX.—*On the Digestive Organs of Infusoria.*

By M. F. Dujardin*.

The experiments of artificial coloration had led M. Ehrenberg to recognise in 1830 the existence of deglutition in many Infusoria; considering at that time as stomachs all the vesicles in which the colouring matter had lodged, this observer endeavoured to find out the mode of connexion of these stomachs with a mouth and anus. Deceived undoubtedly by some illusion, he thought he perceived a central tube, straight or variously curved, to which the stomachic vesicles were attached by still narrower tubes, like the berries of a bunch of grapes. He described and figured *Enchelys pupa* with a straight intestine, *Leucophra patula* with the intestine curved three times, and *Vorticella citrina* with the intestine forming almost a complete circle, and returning to open for excretion at the side of the mouth. In the Monads, on the contrary, he represented the stomachs as attached around the mouth by long pedicles, and not affixed to the intestine. Although in the text of his memoir he took care to state that the vesicles filled with a solid nutriment are spherical and appear to be isolated, because the intestine which unites them contracts and becomes transparent, yet his drawings, supposed to be made after nature, represent this intestine equally extended everywhere, and even filled with colouring matter in *Vorticella*, so that one was naturally led to think that these representations were ideal. It did not escape him that a vesicle was capable of dilating considerably so as to contain a very voluminous prey, and consequently he admitted that the intestine must have dilated equally in order to allow it to pass. He had not yet noticed the difference between the vesicles or the globules of the interior, but he then attached so much importance to the discovery which he thought to have made of the intestine of Infusoria, that he made it the basis of his classification, calling Polygastrica the true Infusoria in opposition to the Rotatoria which are monogastric, and which united by him under the same denomination furnished false analogies. He distinguished

* Extracted from F. Dujardin's 'Mémoire sur l'Organisation des Infusoires,' Annales des Sciences Naturelles, November 1838.

the *Anentera*, which, unfurnished with intestines like the Monads, have their pedicellated stomachs simply suspended around the mouth, and the *Enterodela* which possess an intestine.

These were divided into *Cyclocœla*, *Orthocœla*, and *Campylocœla*, according to whether the intestine formed a circle as in the *Vorticella*, straight as in *Enchelys*, or contorted as in the *Leucophræ*; but the author, to conform, he observes, to the received laws of zoology, immediately substituted for these divisions other sections established on external characters depending on the position of the intestine, i. e. on the position of the anus and mouth. He thus termed *Anopisthia* the *Cyclocœla* which have the two apertures united in front; *Enantiotreta* those with the two apertures opposite and situated at the extremities of the body, and which may be subdivided into *Orthocœla* and *Campylocœla*; *Allotreta* those having one of the apertures terminal, the other lateral; and lastly *Katotreta*, those in which both apertures are lateral or non-terminal. In his second memoir (1832), M. Ehrenberg, without adducing new facts in support of his opinion, developed further his first ideas. In his third memoir (1833) he figured in two new types *Chilodon cucullus* and *Stylonychia mitylus*, the intestine as large, if not larger than in the three preceding species, which seems to be in contradiction to the extreme contractability which would have concealed this organ from the persevering investigations of other observers. At the same time he began to establish a distinction between the vesicles which can be filled by the colouring matter, and those which, always containing a diaphanous fluid and generally more voluminous and less susceptible of sudden contractions, are considered by him to be the male organs of generation. Even in 1776 Spallanzani had mentioned in the *Paramœciæ* these latter vesicles, which in this species are stelliform, but had assigned respiratory functions to them. M. Ehrenberg, on the contrary, following up his ideas of the signification or analogies of these parts, has afforded himself a means of solving, in appearance, the difficulties presented by the explanation of the functions of all these inner vesicles.

In his large work recently published in 1838, he has re-

produced without any alteration the figures of five species, previously represented with an intestine much expanded, and has moreover added, as also showing this organ, the figure of *Trachelium ovum* already described in 1833 (third memoir), with a large sunk band in the centre, and whence proceed very thin ramifications, anastomosing, which truly has no relation to the primitively supposed intestine so contractile and so difficult to perceive. He has also figured an intestine more or less complete in several *Vorticellinæ*, and this intestine dilated uniformly in some is represented in the figure of one of them (*Epistylis plicatilis*) as being from time to time inflated, as if the stomachs, instead of being appended in raceme, were arranged one after the other. With respect to the figure of *Paramœcium Aurelia*, with a curved intestine, he himself remarks, that it is only an ideal figure. While declaring that it is only in seven species, four of which are *Vorticellinæ*, in which he has been able to distinguish plainly the intestine so as to be able to draw it*; he enumerates among the four species in which he had been able to trace it only from the successive passage of the nutriment, precisely the two Infusoria given in 1830, as having been the first that exhibited the intestine to him; moreover he has placed by the side of his old figures of *Leucophra* some new ones which seem to contradict them†. It will also be noticed with what urgency the author recommends the *Vorticellinæ* for the verification of this important fact, and the tendency which he has always shown to neglect representing the intestine in those species which he had cited in his first memoir as having been the first in which he had noticed this organ; thus, the example of *Leucophra* loses a great part of its value by comparison with the new drawings, the *Paramœciæ* have furnished but an ideal figure, and the *Kolpodea* have never been represented by him with any intestine whatsoever.

Can the analogy of the *Rotatoria* or *Syntolides*, &c., be called in aid, as has been already done, to prove the existence of an intestine in Infusoria, in which it is not even possible

* Die Infusionsthierchen, von Ehrenberg, 1838, p. 362.

† Die Infusionsthierchen, von Ehrenberg, 1838, Pl. XXXII. fig. 1, 2, 3, 4, 6.

to indicate a trace? But, as I have before stated, the difference between the two types is so great that this analogy is one of the most imperfect; and while denying the existence of an intestine in the true *Infusoria*, I admit in the *Rotatoria* not only an intestine, but even true jaws, respiratory organs, glands and an ovary.

Can it be said, that it suffices to have demonstrated that the alimentary substances have penetrated from outwards into these vesicles, to conclude, first, that they are stomachs, and then that these stomachs must communicate with an intestine? for it would not be possible to conceive stomachs having no communication with the exterior. But that is precisely what might be contested; for this consequence is founded on a false analogy with higher animals, in which the stomach is always in continuation with the intestine. But before coming to direct proofs, we must examine one objection which was first advanced by M. Bory de St. Vincent in 1832, was reproduced in 1835 by Dr. Foeke, of Bremen*, and has recently been again presented to M. Ehrenberg, by Prof. Rymer Jones, before the British Association at Newcastle. This objection, which I consider well-founded, rests on the inner motion of the globules or sacculi, which can in no way be reconciled with the hypothesis of an intestine connecting all these globules together, and which, on the contrary, proves their entire independence. As M. Bory observed, the intestines, the tubes of communication, did they exist, would soon become inextricably entangled, unless by supposing them to be indefinitely extensible, they would not allow of the globules moving about as they do in the interior.

To these objections, founded on the displacement of the pretended stomachs in the interior of the Infusoria, M. Ehrenberg answers in his great work, that this motion is merely an apparent displacement, analogous to that of the small painted

* The analysis of the communication made by Dr. Foeke to the Association of German Naturalists at Bonn in 1835, will be found in the Isis for 1836, p. 785. M. Foeke says he had never been able to distinguish the supposed intestine in *Stentor Müllerí*, in *Loxodes bursaria*, and in a species of *Vaginicola*; and declares that the evident motion of the nutriment or of the colour in the interior of the body of these animalcules is incompatible with the supposition of the existence of an intestine. (*Hier muss also eine andere Organization des Darmcanals, als die von Ehrenberg angegebene, stattfinden.*)

wooden figures which children put in motion upon the plaything consisting of an extensible arm, formed of splines crossed lozenge-wise. This inner displacement, which I thought in 1835 capable of explanation by the change of position in the Infusoria, by their rotation around the axis of their body, I have for two years considered as quite real, and it has been well seen and described by Prof. Rymer Jones*. This observer, in declaring publicly at Newcastle that he never had been able to perceive the least trace of the central canal described by M. Ehrenberg, nor the branches which proceed therefrom to communicate with the sacculi, added that he was convinced from numerous observations, that in *Paramœcium Aurelia* and in allied species the minute gastric sacs (vesicles) move in a fixed direction all round the body of the animalcule; —a fact, which of itself, says the English observer, appears to be incompatible with the arrangement indicated by the Professor of Berlin. To this M. Ehrenberg, without recurring to the comparison to the child's toy, answered, that it is excessively difficult to see the central canal (the intestine), and that it was only in following the course of great masses of nutriment that he himself had been able to trace it.

This is not what was first stated, and still less what had been represented in the figures of 1830 reproduced in 1838. But it is at present seen, from the very confession of the inventor, that the whole theory of the inner structure of the Infusoria rests on ideal figures and on observations impossible to be verified on those very Infusoria on which they had been founded†. And be it well remembered, these observations,—this discovery of the intestine,—were made previous to 1838, with instruments evidently less perfect than those since employed by the author, and which have allowed him to discover the armature of the mouth of *Nassula* and of *Chilodon*, and re-

* In the Athenæum, No. 567, p. 635.

[The report in the Athenæum contained several erroneous statements, some of which were corrected in a reply to Prof. Jones from Dr. Ehrenberg inserted in vol. ii. p. 121. of this Journal.—Edit.]

† We certainly must say that we cannot see all this, and think it very possible that M. Dujardin will have at some future day to do, what he has so frequently done already,—namely to announce that many of his present assertions are *trop hazardées*.—Edit.

cognise the generative organs in all the Infusoria, and the locomotive filament of the *Monadinæ* and the *Euglenæ*, &c. Now would not a fact as important as that which served as basis to the physiology and classification of the Polygastrica deserve, not only ten, but even a hundred confirmations? Ought it not to have been confirmed a hundred times with the means of observation, which the author informs us has become more and more powerful in his hands? Ought it not to be especially clearly expressed in most of his figures so as to be capable of being verified? Far from this, the fact, diminished and almost entirely disappearing in the vast extent of the grand treatise on Infusoria, is limited to the same examples previously cited and become in some sort superannuated by the very deed of the author. And M. Ehrenberg, not condescending to reply to the objections made to him already for many years since, traverses the continent to go and hear at Newcastle in presence of the British Association objections no less forcible.

I attempted in 1835 (Ann. Sc. Nat. Dec.) to prove the non-existence of the intestine in Infusoria by this sole fact;—that to be so extensible and contractile as supposed, it ought to contain in its tissue at least some fibres which would remain and become visible when the animalcule decomposed by diffluence. Now I said that in this kind of dissolution not one single trace of intestine can be perceived, and this phænomenon of diffluence moreover tends to prove in every way the simplicity of the organisation of the Infusoria. Having seen in 1836 several *Nassulæ* swallow some long fragments of *Oscillatoria* which were curved in the interior and distended the animalcules in the form of a sac, I cited this fact in a subsequent memoir, as proving, it is true, the deglutition which I was wrong in previously denying, but also as quite incompatible with the hypothesis of an intestine and true stomach. In fact I noticed other vesicles containing fragments of *Oscillatoria* at the same time entirely independent one of the other; and the large vesicle excavated by the elasticity of the *Oscillatorium* communicated in its entire breadth with the mouth and not by a tube or branch of the central canal. The objection which I then made against the existence of an intestine, the fibres of

which ought to have been persistent, I now again repeat, and the more so, as M. Ehrenberg insists more strongly on the great contractibility* of this intestine to explain the reason why it is never seen in a large number of species: "it is," he observes, "because this canal, like the œsophagus of larger animals, serves merely for the passage of the aliments, and not to contain or digest them, which takes place solely in the stomachic vesicles: it dilates at will for the passage of the nutriment like the small mouth or throat of a serpent when swallowing a rabbit, and contracts immediately afterwards and becomes entirely invisible if not in action." But, it may be said, if the indefinite contractibility of the stomachic vessels and their digesting action be admitted, we may suppose them, with greater reason, to have a rather complex membrane, and containing as many, if not more fibres, than the intestine; now these vesicles on their decomposition by diffluence never show any fibres. We must therefore conclude either that the contraction is effected without fibres, or that these fibres are really invisible in the vesicles as in the intestine. I shall presently show that the vesicles must be regarded as vacuities excavated at will in the gelatinous substance of the interior, and that consequently they are without any peculiar membrane, and contract by the approximation of the mass; I shall state that the alleged diaphanous vesicles observed at the exterior of the body of the Infusoria are nothing more than globules of sarcode, expelled by expression, or by laceration, or by the diffluence of the body of the animalcule, as proved by their refraction and by their faculty of decomposing in excavating vacuoles; but there is a single fact mentioned by Dr. Ehrenberg in his third memoir in 1833, and which I had not been able to understand in 1836, 'Ann. Sc. Nat.' April 1836, any more than at present. It relates to a stomachic vesicle expelled from *Bursaria vernalis* decomposing by diffluence, and which still contained two fragments of *Oscillatoria*. It is in this manner, at least, that he then represented it (Pl. III. fig. 4 *x*.), and he has reproduced the same figure, consequently the same fact, in his large work.

* Die Infusionsthierchen, 1838, p. 362.

M. Ehrenberg* considers the separation and isolation of the stomachic vesicles as surprising only to those who have not observed earth worms cut into pieces. These pieces, he observes, let them be ever so minute, contract at each extremity in such a manner that but very little of the contained juices escape, and a similar effect is produced by the contraction of the isolated stomachs of the Infusoria. One fact undoubtedly is more forcible than all arguments; and I only regret that that of a vesicle containing fragments of *Oscillatoria* has not presented itself several times to the observer; for with respect to the alleged stomachs without contained aliments, even when they appear slightly coloured, the false comparison with the pieces of earth worms will not suffice to prove to me that the globules are not part of the gelatinous substance of the Infusoria, since I have frequently seen these globules coloured, either from their having a tinge of their own, or that this effect was the result of an optical illusion or of a phænomenon of accidental colours.

XXI.—*Descriptions of British* Chalcidites. By Francis Walker, F.L.S.

[Continued from vol. ii. p. 355.]

Sp. 45. Cirrospilus Murcia, Mas. *Cyaneus, abdomen cupreum, antennæ nigro-piceæ, femora nigra, tibiæ piceæ, tarsi fusci, protibiæ fulvæ, alæ sublimpidæ.*

Obscure cyaneus: oculi et ocelli rufi: antennæ nigro-piceæ; articuli 1^{us} et 2^{us} nigro-cyanei, hic apice piceus; abdomen cupreum: pedes fusci; coxæ nigræ; femora nigra; tibiæ piceæ; genua fulva; propedum femora apice fulva: alæ sublimpidæ; squamulæ piceæ; nervi pallide fusci. (Corp. long. lin. $\frac{2}{3}$; alar. lin. 1.)

Found near London.

Mas. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum; vertex sat latus; frons abrupte declivis: oculi mediocres: antennæ filiformes corporis longitudine, pilis longis vestitæ; articulus 1^{us} gracilis, sublinearis; 2^{us} longicyathiformis; 3^{us} brevis; 4^{us}, 5^{us} et 6^{us} longi, lineares; clava longifusiformis, acuminata, articulo 6° duplo longior: thorax ovatus, convexus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ remotæ, bene determinatæ; scutellum breviconicum: metathorax transversus, mediocris: petiolus brevissimus: abdomen sublineare, planum,

* Die Infusionsthierchen, 1838, p. 361.

horace brevius, fere angustius ; segmentum 1um magnum, 2um et sequentia breviora, transversa : sexualia exerta : pedes graciles, simplices, subæquales ; tarsis articuli 1° ad 3um curtantes, 4us 3° longior ; ungues et pulvilli parvi : alis nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus ad alæ apicem propensus stigma parvum fere bimucronatum fingens.

Fem. Antennæ subclavatæ, corporis dimidio longiores ; articulus 4us 3° brevior ; 5us adhuc brevior ; clava fusiformis, acuminata, articulo 5° duplo longior : abdomen longiovatum, thorace longius, vix latius, supra planum, subtus carinatum, apice acuminatum.

Sp. 46. Cirr. Athyrte, Mas et Fem. *Cyaneo-viridis, cupreo-varius, antennæ fuscæ aut nigræ, pedes flavi, femora piceo- aut viridi-varia, alæ sublimpidæ.*

Fem. Cyaneo-viridis : oculi et ocelli rufi : antennæ fuscæ ; articulus 1us viridis ; 2us piceus, apice fulvus : gula flava : abdomen cupreo-varium : oviductus vaginæ nigræ : pedes flavi ; coxæ virides ; tarsi apice fusci ; protarsi fulvi ; mesofemora piceo-cincta ; metafemora viridia, apice flava : alæ sublimpidæ ; squamulæ fulvæ ; proalis nervi fulvi, metalis flavi.

Mas. Antennis articulus 2us viridis, apice fulvus ; gula picea : abdomen cupreum : sexualia picea : femora flava, basi supra picea. (Corp. long. lin. ⅔—1 ; alar. lin. 1—1⅓.)

Var. β. *Fem.*—Abdomen cupreum, apice cyaneo-viride cupreo-varium : propedum femora basi viridia, tibiæ extus fulvæ : meso- et metatibiæ fulvæ, apice et basi flavæ.

Var. γ. *Fem.*—Thoracis discus cupreo-varius.

Var. δ. *Fem.*—*Var.* γ. similis : pro- et mesofemora flava, basi supra picea.

Var. ε. *Fem.*—Alæ limpidæ.

Var. ζ. *Fem.*—Abdomen cupreum : meso- et metafemora flava, piceo vittata : alæ limpidæ.

Var. η. *Fem.*—Viridi-cyaneus : abdominis discus cupreo-varius : femora flava, piceo-cincta ; alæ limpidæ.

Var. θ. *Fem.*—Cyaneus : abdomen cupreum : femora flava, piceo-cincta ; alæ limpidæ.

Var. ι. *Fem.*—Femora omnia basi viridia.

Var. κ. *Fem.*—Cupreus : caput et mesothoracis scutellum viridia.

Var. λ. *Fem.*—Antennæ nigræ ; articuli 1us et 2us virides : abdomen supra cupreum : pro- et meso-femora basi viridia.

Var. μ. *Fem.*—Cyaneo-viridis æneo-varius : antennis articuli 1us et 2us virides, hic apice subtus fulvus : abdomen cupreum : femora flava, basi viridia.

Var. ν. *Fem.*—Obscure viridis : antennæ piceæ ; articuli 1us et 2us virides, hic apice fulvus : thoracis discus cupreo-varius : abdominis discus cupreus : femora flava, basi viridia ; propedes tibiis et tarsis fulvis.

Var. ο. *Fem.*—*Var.* ν. similis : thorax omnino viridis : femora viridia, apice flava.

May to September ; near London, Hampshire. Found by Mr. Haliday, on willows, near Belfast, Ireland.

Sp. 47. Cirr. Bunus, Mas et Fem. *Præcedenti simillimus, at minor et gracilior.*

Æneo-viridis: oculi et ocelli rufi; antennæ fuscæ; articulus 1us viridis: 2us fulvus, basi piceus: abdomen cupreum: sexualia picea: pedes flavi; coxæ virides; tarsi apice fusci, metafemora basi picea; protarsi fulvi: alæ sublimpidæ; squamulæ piceæ; nervi fusci. (Corp. long. lin. $\frac{1}{2}$—$\frac{3}{4}$; alar. lin. $\frac{3}{4}$—$1\frac{1}{6}$.)

Var. β. *Fem.*—Antennis articulus 2us piceus: abdomen viridi-varium.

Var. γ. *Fem.*—Caput viride: thorax concolor: antennis articulus 2us piceus, apice fulvus: femora basi picea; metafemora viridia, apice fulva.

Var. δ. *Fem.*—Cyaneo-viridis: antennæ pallide fuscæ; articuli 1us et 2us virides, hic apice subtus fulvus: abdomen viridi-cyaneum; discus cupreo-varius; femora basi picea; alis squamulæ fulvæ, nervi flavi.

Var. ε. *Fem.*—*Var.* δ similis: thorax cupreo-viridis: abdomen cyaneo-cupreum.

Var. ζ. *Fem.*—Cyaneo-viridis, æneo-varius: antennæ nigro-piceæ; articuli 1us et 2us virides: abdomen cupreum: femora nigra, apice flava; propedum femora flava, basi nigra, tibiæ pallide fulvæ, tarsi obscuriores.

September; near London, Devonshire. Ireland, Mr. Haliday.

Sp. 48. Cirr. Abantidas, Mas. *Nigro-viridis præcedentibus simillimus, at longior; abdomen cupreum, antennæ fulvæ, pedes flavi, alæ limpidæ.*

Nigro-viridis: oculi et ocelli rufi: os fuscum: antennæ fulvæ; articulus 1us viridis; 2us basi piceus: abdomen cupreum: pedes flavi; coxæ virides; femora picea, apice flava; tarsi apice fusci; protarsi fulvi: alæ limpidæ; squamulæ piceæ; nervi fusci, basi fulvi. (Corp. long. lin. $\frac{4}{5}$; alar. lin. $1\frac{1}{3}$.)

Found near London.

Sp. 49. Cirr. Menius, Mas. C. Buno *simillimus, antennæ densius pilosæ.*

Obscure viridis: oculi et ocelli rufi: antennæ nigro-piceæ; articuli 1us et 2us virides, hic apice et subtus piceus: abdomen nigro-cupreum: sexualia picea: pedes flavi; coxæ virides; femora basi nigra; tarsi apice fusci; protibiæ fulvæ; meso- et metatibiæ pallide fuscæ, apice et basi flavæ; protarsi fulvi: alæ sublimpidæ; squamulæ piceæ; nervi fulvi. (Corp. long. lin. $\frac{1}{3}$—$\frac{1}{2}$; alar. lin. $\frac{3}{4}$—$\frac{4}{5}$.)

Var. β.—Meso- et metatibiæ flavæ, fusco-cinctæ.

Found near London.

Sp. 50. Cirr. Enagoras, Mas. *Nigro-viridis, abdomen cupreum, antennæ piceæ, pedes fusci, alæ subfuscæ.*

Nigro-viridis: oculi et ocelli rufi: antennæ piceæ; articuli 1us et 2us virides: abdomen cupreum: sexualia picea: pedes fusci; coxæ virides; trochanteres fulvi; femora viridia, apice flava; tarsi basi fulvi; protibiæ fulvæ: alæ subfuscæ; squamulæ piceæ; proalis nervi fusci, metalis fulvi. (Corp. long. lin. $\frac{2}{3}$; alar. lin. 1.)

Found near London.

Sp. 51. Cirr. Molo, Fem. *Cyaneus, viridi- et æneo-varius, antennæ fuscæ, pedes flavi, femora viridia aut cyanea: alæ limpidæ.*

Cyaneo-viridis: oculi et ocelli rufi: antennæ fuscæ; articuli 1^us^ et 2^us^ virides, hic apice et subtus fuscus: abdomen cyaneum æneo-varium: pedes flavi; coxæ virides; femora basi viridia; tarsi apice fulvi; metafemora viridia; propedum tibiæ et tarsi fulva: alæ limpidæ; squamulæ fulvæ; nervi fulvi. (Corp. long. lin. $\frac{1}{2}$—$\frac{2}{3}$; alar. lin. $\frac{3}{4}$—$\frac{4}{5}$.)

Var. β.—Cyaneus: abdomen æneo-varium: femora cyanea.

Var. γ.—*Var.* β. similis: abdomen omnino cyaneum: profemora flava, basi cyanea.

Found near London.

Sp. 52. Cirr. Epicharmus, Fem. *Nigro-viridis, abdomen cupreum, antennæ nigræ aut fuscæ, femora viridia, tibiæ piceæ aut fuscæ, tarsi flavi, alæ latæ limpidæ.*

Nigro-viridis: oculi et ocelli rufi: antennæ nigro-piceæ; articuli 1^us^ et 2^us^ virides: abdomen cupreum: pedes picei; coxæ virides; femora viridia; genua fulva; tarsi fulvi, apice fusci; propedum tibiæ subtus fulvæ, tarsi fusci: alæ limpidæ; squamulæ piceæ; nervi fulvi. (Corp. long. lin. $\frac{2}{3}$—$\frac{3}{4}$; alar. lin. 1—$1\frac{1}{4}$.)

Var. β.—Antennæ fuscæ; articuli 1^us^ et 2^us^ virides, ille basi et hic apice fusci: abdomen cyaneum; discus cupreus: pedes flavi; coxæ virides; femora viridia; tibiæ fuscæ; tarsi apice fusci.

Var. γ.—Antennæ nigræ; articuli 1^us^ et 2^us^ virides: pedes virides; trochanteres picei; genua fulva; tibiæ piceæ; tarsi flavi, apice fusci; protarsi fulvi.

Found near London.

Sp. 53. Cirr. Endemus, Fem. *Cyaneo-viridis, abdomen cupreo-varium, antennæ piceæ, pedes fusci, femora viridia, alæ latæ limpidæ.*

Cyaneo-viridis: oculi et ocelli rufi: antennæ piceæ; articuli 1^us^ et 2^us^ virides; abdomen cyaneum, basi cupreum: pedes virides; trochanteres fusci; genua fulva; tibiæ piceæ; tarsi fusci, basi fulvi; propedes tibiis et tarsis fulvis; mesopedum tibiæ fuscæ, tarsi flavi, apice fusci; metatibiæ piceæ: alæ limpidæ; squamulæ cyaneæ; nervi fulvi; stigma fuscum. (Corp. long. lin. $\frac{3}{4}$—$\frac{5}{4}$; alar. lin. 1—$1\frac{1}{4}$.)

Var. β.—Abdomen cupreum, apicem versus cyaneo-viridi-varium; tibiæ fuscæ; tarsi fusci, basi fulvi; propedum tibiæ fulvæ, tarsi obscuriores.

May, September; near London; Hampshire, Isle of Wight.

Sp. 54. Cirr. Chares, Fem. *Viridis aut viridi-cyaneus, abdomen cupreum, antennæ fuscæ, pedes flavi, femora viridia: angustæ alæ sublimpidæ.*

Viridis: oculi et ocelli rufi: antennæ fuscæ; articulus 1^us^ viridis; 2^us^ supra piceus: abdomen cupreum: pedes flavi; coxæ virides; femora viridia, apice flava; tarsi apice fulvi; protibiæ et protarsi fulva: alæ sublimpidæ; squamulæ fulvæ: nervi fulvi. (Corp. long. lin. $\frac{1}{2}$; alar. lin. $\frac{3}{4}$.)

Var. β.—Cæput viridi-cyaneum: thorax concolor: femora viridi-fusca, apice et basi flava.

Found near London.

Sp. 55. Cirr. Beroë, Fem. *Nigro-viridis, abdomen cupreum, antennæ piceæ, pedes flavi, metafemora picea, alæ latæ limpidæ.*

Nigro-viridis: oculi et ocelli rufi: antennæ piceæ, articuli 1us et 2us virides, hic apice fuscus: abdomen cupreum: pedes flavi; coxæ virides; tarsi apice fusci; metafemora picea; propedum tibiæ et tarsi pallide fulva; alæ limpidæ; squamulæ piceæ; nervi fulvi. (Corp. long. lin. $\frac{2}{3}$; alar. lin. 1.)

Found near London.

Fem. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum: antennæ extrorsum crassiores, corporis dimidio longiores; articulus 1us gracilis, sublinearis; 2us longicyathiformis; 4us 3o brevior; 5us adhuc brevior; clava fusiformis, acuminata, articulo 5o duplo longior: thorax ovatus, convexus; prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ bene determinatæ; scutellum brevi-conicum: metathorax transversus, mediocris: petiolus brevissimus; abdomen longiovatum, thorace longius vix latius, supra planum, subtus carinatum, apice acuminatum: proalæ latæ, nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

Sp. 56. Cirr. Rhacius, Fem. *Æneus aut viridi-cyaneus, antennæ fuscæ, pedes flavi, femora basi fusca aut ænea, alæ limpidæ.*

Æneus: oculi et ocelli rufi: antennæ fuscæ; articuli 1us et 2us ænei, hic apice fuscus: abdomen cupreo-æneum: pedes flavi; coxæ nigro-æneæ; femora nigro-ænea, apice flava; tarsi apice fusci; propedes tibiis et tarsis fulvis: alæ limpidæ; squamulæ fuscæ; nervi fusci. (Corp. long. lin. $\frac{2}{3}$; alar. lin. 1.)

Var. β.—Thorax viridi-æneus.

Var. γ.—Viridis: abdomen viridi-æneum.

Var. δ.—Viridi-cyaneus: antennis articuli 1us et 2us virides: abdomen cupreum: oviductus fulvus; vaginæ piceæ: coxæ virides; femora flava, basi fusca; alis squamulæ fulvæ; nervi flavi.

Found near London.

Sp. 57. Cirr. Ægа, Fem. *Cyaneus, abdomen cupreo-viride, antennæ piceæ, pedes flavi, femora cyanea, tibiæ fusco-cinctæ, alæ sublimpidæ.*

Cyaneus: oculi et ocelli rufi: antennæ piceæ; articuli 1us et 2us cyanei: abdomen cupreo-viride: pedes cyanei; femora apice flava; trochanteres picei; tibiæ fuscæ, apice et basi flavæ; tarsi flavi, apice fusci; protarsi fulvi: alæ sublimpidæ; squamulæ piceæ; nervi flavi. (Corp. long. lin $\frac{3}{4}$; alar. lin. 1.)

Found near London.

Fem. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum: antennæ clavatæ, corporis dimidio paullo breviores; articulus 1us gracilis, sublinearis; 2us longicyathiformis; 4us 3o brevior, 5us adhuc brevior; clava fusiformis, acuminata, articulo 5o duplo longior: thorax ovatus, convexus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum

suturæ bene determinatæ; scutellum brevi-conicum: metathorax transversus, mediocris: petiolus brevissimus: abdomen fusiforme, thorace angustius et multo longius, supra planum, subtus carinatum, apice acuminatum: pedes graciles: alæ mediocres; nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

Sp. 58. Cirr. Anticlea, Fem. *Viridis, cyaneo- et æneo-varius, abdomen cupreum, antennæ nigræ aut piceæ, pedes picei aut fulvo-fusci, femora viridia, tarsi flavi, alæ limpidæ.*

Viridi-cyaneus: oculi et ocelli rufi: antennæ nigro-piceæ; articuli 1^us^ et 2^us^ virides, hic apice fulvus: abdomen cyaneum; discus cupreus: pedes virides; trochanteres picei; genua flava; tibiæ fuscæ, apice flavæ; tarsi pallide fusci, basi flavi; propedum tibiæ et tarsi fulva; alæ limpidæ; squamulæ piceæ; nervi fulvi, basi flavi; metalis nervi flavi. (Corp. long. lin. $\frac{2}{3}$—$\frac{3}{4}$; alar. lin. 1—$1\frac{1}{4}$.)

Var. β.—Viridi-æneus: antennæ nigræ; articulus 1^us^ fulvus, apice piceus: abdomen cupreum, basi cyaneo-viride: pedes fulvi; coxæ virides; femora viridia; meso- et metatarsi flavi, apice fusci; protarsi apice fusci; proalis nervi fusci.

Var. γ.—Nigro-viridis; antennæ piceæ; articulus 1^us^ niger, 2^us^ apice fulvus: abdomen nigro-cupreum: pedes nigro-virides; trochanteres fulvi; genua fulva; tibiæ piceæ, apice fulvæ; tarsi flavi, basi fulvi; protarsi fusci.

July; near London, Isle of Wight.

Mas. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum: antennæ filiformes, hirtæ, corporis longitudine; articulus 1^us^ gracilis, sublinearis; 2^us^ longicyathiformis; 3^us^ brevis; 4^us^, 5^us^ et 6^us^ subæquales, latitudine longiores; clava longifusiformis, acuminata, articulo 6° duplo longior: thorax ovatus, convexus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ bene determinatæ; scutellum breviconicum: metathorax transversus, mediocris: petiolus brevissimus: abdomen sublineare, planum, thorace angustius, non brevius: pedes graciles: proalæ latæ; nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

Fem. Antennæ subclavatæ, corporis dimidio longiores; articulus 4^us^ 3° brevior; 5^us^ adhuc brevior; clava fusiformis, acuminata, articulo 5° duplo longior: abdomen longiovatum, thorace longius, vix latius, supra planum, subtus carinatum, apice acuminatum.

[To be continued.]

XXII.—*Note on the Effects of the Hurricane of January 7, 1839, in Ireland, on some Birds, Fishes, &c.* By William Thompson, Esq.

I shall here record the very few particulars on this subject that have as yet become known to me. As may be conjectured, stormy

petrels (*Thalassidromæ*) were taken in many parts of the country; and chiefly during the latter part of the day of the 7th after the hurricane had ceased. At two o'clock, P.M. or just about its termination, one of these birds was picked up alive, but in a very exhausted state, in one of the streets of Belfast. On the 10th inst. two others, one of which I saw, and found to be the *T. pelagica*, were taken—the one alive, the other dead—beside a spring-well at Seymour Hill, about four miles from Belfast. Near Saintfield in the county of Down, distant about ten miles from this town, I have heard that a petrel was obtained after the hurricane.

Mr. Glennon, bird preserver, Dublin, states that a specimen sent him to be preserved was procured on the 7th in one of the streets of the town of Cavan, and that on the same day another was found at Brown Hall, county of Carlow. C. Carleton L'Estrange, Esq. informs me, that when out woodcock shooting in the plantations at Colonel Eniry's demesne some miles from the town of Cavan, about a week after the 7th of January, he found two petrels which had evidently been dead for a few days or from about the time of the hurricane; they were too much injured by exposure to the weather to be preserved. In the possession of my friend R. Ball, Esq, of Dublin, I have seen a *Thal. pelagica* which was sent him from Kells, county of Meath, where it was procured on the 7th—on the same day a petrel picked up near Mullingar, county of Westmeath, was sent to a gentleman of my acquaintance in Dublin; and on this day likewise I have been informed that one was found dead near the town of Wicklow. Of all these specimens I have seen but the two noticed as *T. pelagica*; of two or three others I could not obtain information sufficiently satisfactory to enable me to judge whether they were this or the fork-tailed species, *Thal. Bullockii*, but the remainder were described in such a manner as to leave no doubt on my mind as to their being the *T. pelagica*. Of the petrels which I have before seen and which were obtained at various times and places throughout Ireland, about as many were of the *T. Bullockii* as of the other, which is considered the more common species. There have been different conjectures as to the cause of the petrels' appearance on land, but in this instance when more of these birds were found scattered over the country than on any previous occasion immediately after the greatest hurricane that has within the memory of the oldest persons swept over Ireland, we are compelled to attribute their presence to its agency alone. From several of these birds having been found in the extreme east as well as the more central portion of Ireland, it would seem from the fact of the hurricane ranging

from the north-west to the south-west, that some of them had been blown from the Atlantic*, almost entirely across the island, a circumstance which, strange as it may appear, is less singular than the occurrence of these birds on a more ordinary occasion in the very centre of England†.

Of the great northern diver (*Colymbus glacialis*), a species which naturally keeps far out from the shore, I saw a specimen in Dublin, that was shot in a dock at Ringsend near that city, after the subsidence of the hurricane.

In a letter from Viscount Cole, dated Hazelwood, Jan. 14, 1839, is the following passage—"I mention underneath a curious fact hardly to be believed, but which two decent men would testify by affidavit—that on the morning after the hurricane a great quantity of perch‡ fry were found thrown up high and dry two yards, and some more, on the grassy shore of Church Island in Lough Gill or Hazelwood Lake, in the county of Sligo." In a note with which I was subsequently favoured, Lord Cole remarked, that he had "heard" of several roach‖ being thrown up on an island in Lough Earn on the night of the great storm. On the 24th of January, Robert Ball, Esq. wrote me from Dublin to the effect—that after the late hurricane the dead bodies of rooks§ to the amazing number of 33,000 (as a matter of curiosity the number was reckoned by some boys) were picked up on the shores of a lake some miles in extent and with extensive rookeries on its borders, in the county of Westmeath; and that in the same locality numbers of perch were thrown to some distance into the fields. The almost incredible mortality of rooks induced me to make further inquiry, when I was informed that Dean Vignolles (on whose property the circumstance occurred), states that the number of these birds above-mentioned were certainly destroyed. This gentleman likewise submitted to Mr. Ball's inspection a more than ordinarily strong panel of a new window shutter which was driven in and broken through by a rook dashing, or perhaps rather from being dashed against it on the night in

* At all times of the year they are met with off the western and northern coasts—they breed in a few of the islands, from Tory in the north, to the Skeligs in the south, inclusive.

† In the Magazine of Natural History for 1832, (p. 283.) two petrels are recorded to have been found dead at Birmingham in December 1831; one was discovered in a street of the town, the other at a few miles distance. The Rev. Mr. Bree of Allesly, who saw the former specimen in Weaver's Museum, has informed us that it is the Fork-tailed species, *T. Bullockii*—*loc. cit.* p. 733.

‡ *Perca fluviatilis.*

‖ The fish so called in Ireland is the rudd, *Leuciscus erythrophthalmus.*

§ *Corvus frugilegus.*

question—he further mentioned that some of the perch were found as far as fifteen yards from the edge of the lake.

Benjamin J. Clarke, Esq. of Merrion Square, Dublin, in a letter to a friend here, states that at La Bergerie in Queen's county, where he was on the 7th of January, he found lying under the branches of an ash-tree which had been blown down, two of the large titmice (*Parus major*); and that in Dublin he saw a specimen of the peregrine falcon (*Falco peregrinus*) that met with its death on the same occasion.

From a newspaper report of the devastation committed by the hurricane at Downhill, in the county of Londonderry, it appeared that a slab blown from the mausoleum, cut completely in two a poor hare that was sheltering beneath it. Thus far only have I heard of the effects of this terrific night upon the lower animals.

Belfast, March 5, 1839.

XXIII.—*On a Meteoric Paper which fell from the Sky in the year* 1686 *in Courland, composed of* Confervæ *and* Infusoria. By Prof. Ehrenberg of Berlin*.

On the 31st January 1687, a great mass of a paper-like black substance fell with a violent snow-storm from the atmosphere near the village of Rauden in Courland; it was seen to fall, and after dinner was found at places where the labourers at work had seen nothing similar before dinner. This meteoric substance, described completely and figured in 1686, 1688, was recently again considered by M. v. Grotthus, after a chemical analysis, to be a meteoric mass; but M. v. Berzelius, who also analysed it, could not discover the nickel said to be contained in it; and Von Grotthus then revoked his opinion. It is mentioned in Chladni's work on Meteors, and noticed as an aërophyte in Nees von Esenbeck's valuable Appendix to R. Brown's 'Botan. Schriften.' I examined this substance, some of which is contained in the Berlin Museum (also in Chladni's collection) microscopically. I found the whole to consist evidently of a compactly matted mass of *Conferva crispata*, traces of a *Nostoc*, and of about twenty-nine well-preserved species of

* Translated from the Berichte der Academie der Wissenschaften zu Berlin, 1838.

Infusoria, of which three only are not mentioned in my large work on Infusoria, although they have since occurred living near Berlin; moreover, of the case of *Daphnia Pulex*? Of the twenty-nine species of Infusoria, only eight have siliceous shields, the others are soft or with membranous shields. Several of the most beautiful exceedingly rare *Baccillariæ* are frequent in it. These Infusoria have now been preserved 152 years. The mass may have been raised by a storm from a Courland marsh and merely carried away, but may also have come from a far distant district, as my brother Carl Ehrenberg has sent from Mexico forms still existing near Berlin. Seeds, leaves of trees, and other things of the kind scattered through the mass, were, on the examination of larger portions, easily visible. The numerous native Infusoria and the shells of the common *Daphnia Pulex* seem to speak thus much for the substance, that its original locality was not the atmosphere nor America, but most probably either East Prussia or Courland. The substance and drawings of all the constituent parts were laid before the Academy.

BIBLIOGRAPHICAL NOTICES

The London Flora. By A. Irvine, of Marischal College, Aberdeen, London, 1838. 12mo.

It has been commonly supposed that the London district did not extend to more than a few miles, twenty-five at most, from St. Paul's, but the author of this book extends it to the English Channel, Southampton, Oxford, Buckingham, and parts of Lincolnshire and Derbyshire.

He proposes, but does not adopt, numerous alterations in nomenclature, many of which would doubtless be improvements, and it is much to be wished that they had been made by Linnæus. All such changes are, in the present day, greatly to be deprecated as only introducing confusion into the synonymy; similar alterations were attempted by Gray in his Natural Arrangement, Salisbury, and others; but there is not, we believe, a single instance of their being adopted in a work of authority. The author objects to the formation of specific names like *Smithii, Michelii,* &c., and proposes that they should always terminate in *ana,* not probably knowing that the most correct

nomenclators of plants use the genitive of the substantive when expressing the connection of discovery or original description between the plant and the person commemorated; and the adjective when no such connection exists, and the name is only a compliment.

The earlier part of this book is occupied by short accounts of Classification, Geographical Distribution, and Vegetable Organization and Physiology, and then follows a long exposition of the Natural Orders. These dissertations may be of use to the medical student preparing for examination, but are far too superficial for the botanist.

We now come to the "descriptive Botany," which we suspect has been written several years, for the author is manifestly unacquainted with the third volume of the 'Suppl. to Eng. Bot.,' the later volumes of the 'Linnæan Transactions,' and the 'Magazine of Zoology and Botany.' The descriptions are probably sufficient for the *mere* English botanist who is quite satisfied if he can *reduce* a plant to some species of Smith or Hooker, not suspecting that it can have been omitted by those excellent authors; but we hope that that class is rapidly becoming extinct, and that British botanists will soon take their station upon an equality with those on the continent of Europe. This remark does not of course apply to our leading botanists, who have long been celebrated for their deep and careful research.

In the Appendix distinguishing marks are requested between *Habenaria bifolia* and *chlorantha* (plants which appear to be confounded by the author): we would refer him either to an early number of this Journal or to the 'Suppl. to English Botany,' where they will be found carefully pointed out. We suspect that Mr. Borrer will be not a little surprised to learn that *Isnardia palustris* grows "sparingly on the south side of the bog on Henfield common; more plentiful on the other side." We have several times had the advantage of examining that bog, with Mr. Borrer, but have never seen a trace of this plant.

The book concludes with a Glossary and very copious Index.

The Little English Flora, or a Botanical and Popular Account of all our common Field Flowers. By G. W. Francis.

We spoke with commendation in the 'Companion to the Botanical Magazine,' of Mr. Francis's little 'Manual of the British Ferns.' The success of that work has induced him to undertake the present; his object being, first, "to invite the young to the ex-

amination of the flowers of the field," by pointing out the beauties they are likely everywhere to meet with, that thus an additional charm may be added to their rambles over the meads and commons; and secondly, to induce a love for the science itself, by showing that it is easy of acquirement, and that it yields instruction and delight, not merely in our after progress, but even from our first commencement of its study. This object we think the author has fully attained. The descriptions are entirely popular, accompanied by remarks and by poetical extracts, which will be read with pleasure by the young student. The plates are numerous and executed by Mr. Francis on the same size and plan with those of his ferns. We could have wished that, if not the plants themselves, yet that the details were represented upon a larger scale, so as to exhibit more clearly the generic and specific distinctions.

We should hardly do justice to our feelings, did we not introduce in our list of botanical publications, and did we not refer to a recent work of Mr. Loudon's as one of the highest importance and of the greatest utility to the arboriculturist; to every nobleman and gentleman of landed estate, who is desirous of improving his property and enlarging the resources of his country; and to every botanist and cultivator who wishes to become acquainted with the trees and shrubs, whether indigenous or exotic, which will bear the climate of Great Britain: we allude to the "*Arboretum et Fruticetum Britannicum*, or the Trees and Shrubs of Britain, native and foreign, hardy and half-hardy, pictorially and botanically delineated, and scientifically and popularly described; with their propagation, culture, and management, and uses in the arts, in useful and ornamental plantations, and in landscape gardening; preceded by a historical and geographical outline of the trees and shrubs throughout the world," by J. C. Loudon, F.L. and H.S., &c., author of the 'Encyclopædia of Gardening and of Agriculture,' and conductor of the 'Gardener's Magazine': in eight volumes; four of letter-press, illustrated by above 2500 engravings, and four of 8vo and 4to plates. And in this ample and characteristic title there is nothing promised that is not fully and skilfully performed—so skilfully, that we will venture to say, there is not a naturalist in Europe who could have executed the task with anything like the talent and judgement and accuracy that is here displayed by Mr. Loudon. The first volume contains the history, geography, science, and descriptions (arranged according to the system of DeCandolle,) from *Ranunculaceæ* to *Staphyleaceæ* inclusive;

the second volume, descriptions from *Celastraceæ* to *Apocynaceæ* inclusive; the third volume, descriptions from *Asclepiadaceæ* to *Corylaceæ* inclusive; the fourth volume, from *Garryaceæ* to the end. The fifth, sixth, seventh, and eighth volumes are entirely occupied with plates of portraits of trees, and representations of their leaves and flowers and fruits. These are copper-plates; but we must confess, that in point of execution we give the preference to the very numerous wood-cuts which so beautifully illustrate the descriptions they accompany—and these are not confined to representations of plants and their analyses, but include landscapes and scenery of various kinds, where certain trees form a characteristic feature; and insects and parasitic vegetables which do injury to their plants are faithfully exhibited and described, and the best modes of their destruction are recommended. In short, nothing is omitted, either in the descriptive or pictorial matter, which can tend to illustrate the history and uses of *trees* and *shrubs*; and when it is considered that these vegetables include the most valuable materials for our ships and dwellings and implements of various kinds, the greatest ornaments of our parks, our gardens, and pleasure-grounds, and most of the fruits which are cultivated in the open air with us, it will be at once seen of what vast importance must such a work be to this country, to every part of Europe and the temperate parts of North America; and we may even say, to all the temperate parts of the civilized world. We are sorry that the nature of our Journal does not allow us to make such copious extracts as would give an idea of the execution of the historical and scientific department of the work—but this is the less to be regretted, since other Journals have not been backward in doing justice to its great merits, and since it has received the highest encomiums from an able writer in the Quarterly Review for October 1838, (an honour not often accorded to works on Natural History,) with whose concluding words we shall terminate our brief notice. "Let us warmly congratulate our author on having finished his herculean task; a task which few men except himself would have had the courage to begin, and still fewer the perserverance to complete. The *Arboretum Britannicum* is unique in its kind, and it must become a standard book of reference on all subjects connected with trees."

Enumeratio Plantarum quas in Novæ Hollandiæ ora Austro-occidentali ad fluvium Cygnorum et in sinu Regis Georgii collegit Carolus Liber Baro de Hügel.

Under this title, has appeared at Vienna the first number of a

work on the plants of the Swan river and King George's Sound, collected during the voyages and travels of Baron von Hügel, an Austrian nobleman, of which we gave some account in the second volume of the 'Companion to the Botanical Magazine,' p. 190. Following, with some trifling alterations, the arrangement of De Candolle, this fasciculus comprises from the *Ranunculaceæ* to *Primulaceæ* inclusive. Besides containing full descriptions of the new and rare species of the localities just mentioned, it includes, in the notes, remarks on other Australasian species; as for example, of *Candolleæ*, *Rhamneæ*, *Brachycomæ*, &c. The authors of the different portions of this work are, Mr. Bentham of the *Leguminosæ*, and all the orders of *Gamopetalæ*; Edward Fenyl of the *Paronychieæ*, *Rhamneæ*, *Haloragеæ*, *Portulaceæ*, *Loranthaceæ*, *Restiaceæ* and *Cyperaceæ*; Henry Schlott of the *Cryptogamia*; and of the rest Stephen Endlicher.

The Edinburgh New Philosophical Journal. Conducted by Professor Jameson. Number for April 1838. Edinburgh, A. Black and Co. 8vo.

[Continued from vol. i. p. 398.]

April 1838. *Zoology.*

There are not many papers purely zoological in this number; at the same time, there are several very interesting, and which touch, to a certain extent, on various points intimately connected both with Zoology and Botany:—On the cause of the Temperature of Hot and Thermal Springs, &c.; by Professor Gustav Bischof of Bonn. Remarks on the geographical position of some points on the west coast of Scotland; by William Galbraith, Edinburgh. Observations on the Hurricanes and Storms of the West Indies, and the coast of the United States—and, on the Differences of the Laws regulating Vital and Physical Phænomena; by William B. Carpenter, will be found worthy of perusal. I. *Observations on Rabies or Madness in Dogs, Oxen, Horses, Pigs and Sheep*; by Dr. Wagner, Medico-Forensic Censor of the Schieben District. "*In Dogs*" a dread of water is not an invariable symptom attending rabies, several instances having occurred to the author where this was not exhibited. "*In Oxen*" the author has met with the most numerous instances of madness. Two states of it appear to prevail; one in which there is no apparent loathing of water, and where the animal pines and loses condition, but seems to be urged by no vicious propensity; life is terminated between the sixth and the ninth day; the animals sink on one side (mostly on the left), the head stretched backwards; the trunk con-

tinues motionless, while the legs undergo a constant but languid movement to and fro, until the animal has ceased to exist. The other state is more violent, with periodical paroxysms; about the fourth day they will snap every kind of fastening, and attack and gore all who approach them, and continue thus until palsy of the joints supervenes. On dissection the gall-bladder is discovered filled to excess with muddy yellowish-green coloured bile. "*In Horses*" the rabies increases to such an extent on the second or third day, that no person or creature can approach them without being bit and kicked in the most frightful manner. "*In Pigs*" only one instance was known, and the symptoms were very violent; an end was put to existence; and by the disgraceful conduct of a butcher, the carcase was exposed for sale, and cut up and disposed of; no mischief, however, was heard of as arising from the consumption of it. "*In Sheep*" also, only one instance was known arising from a bite; the animal kept quiet and dejected, but it was killed before the termination of the disease was seen. The author has known the milk of rabid animals taken, and in two instances the flesh of rabid oxen eaten, without any bad effects. He has also known the bite of decidedly rabid animals not to produce any bad effects, and he argues from this, that with mankind a predisposition to Hydrophobia very rarely exists. (This paper is a translation from Hecker's Annalen.)

Botany.

I. *An attempt to ascertain characters of the Botanical Alliances*; by Sir Edward Ffrench Bromhead, Bart. II. *Description of several new or rare Plants which have lately flowered in the neighbourhood of Edinburgh, chiefly in the Royal Botanic Garden;* by Dr. Graham, Professor of Botany. Three plants only are mentioned, *Aristolochia saccata, Batemannia Calleyi,* and *Rhododendron albiflorum,* the last reared from seed sent from British America by Mr. Drummond. In speaking of the *Aristolochia,* Dr. Graham notices a curious property in the pouches, the reason of which is left undetermined, and which would be well worthy of the attention of those who delight in tracing *design* in the structures of natural productions. "The ensnaring of insects by plants is observed in many cases, its use disputed, sometimes I think misunderstood, and its benevolence in the arrangement of Nature considered equivocal. One thing is obvious, it demonstrates premeditation and design in the configuration of parts. The large heavy pouch in the middle of the tube necessarily keeps the flower pendulous, and its throat erect. Having removed from the plant one of the racemes for examination, I laid this down on the

table, and was surprised to see a crowd of small flies immediately rush out at the throat; I raised the flowers into their natural position again, and though I saw, by placing them between me and the light, that very many flies were still in the tube, all very restless and attempting to escape, not one could climb up the now erect throat. I could not discover with the microscope any cause for this, and am forced to suppose that there may be a particular condition of the surface in the upper part of the tube from secretion or some other cause, which prevents the adhesion of the feet of the insects, though they are able to walk along it when horizontal."

Microscopic Illustrations of Living Objects, &c.; with Researches concerning the most eligible method of constructing Microscopes and Instructions for using them. By Dr. C. R. Goring and A. Pritchard. 8vo. Whittaker and Co. 1838.

The present work may be divided into two parts, the first by Mr. Pritchard on the natural history of several aquatic larvæ, which on account of their great transparency are well suited for the microscope; forming as they do objects of great amusement to the general observer, and of research to the inquiring naturalist. Among these are the larvæ of a species of gnat, of *Ephemera marginalis*, and of a species of *Hydrophilus*, each being illustrated by several wood-cuts, and a highly finished coloured engraving. The second part, the mechanical and practical part, is, with the exception of the Introduction, from the pen of Dr. Goring,—on the terms employed in microscopic science, method of constructing and using microscopes, practical remarks on viewing and drawing of microscopic objects, illustrated by numerous wood-cuts and a well-executed copper-plate. A great portion of this has been rewritten on account of the great progress made in this department of science since the appearance of the first edition. Mr. H. F. Talbot's memoirs on the optical phænomena of crystals, which appeared in the 'Philosophical Transactions' for 1837, and observations on Swammerdam's method of dissecting and preparing objects for the microscope, extracted from 'Adam's Essays on the Microscope,' are added as an Appendix, and give additional interest to the volume.

The style is popular without being diffuse, and the matter on the whole exceedingly well arranged. We have no doubt that the work will meet with a favourable reception both from the general lover of science and from those more deeply engaged in unveiling some of the wonderful mysteries with which nature abounds.

PROCEEDINGS OF LEARNED SOCIETIES.

LINNÆAN SOCIETY.

February 5.—Edward Forster, Esq., V. P., in the Chair.

Read, a paper entitled "A Note upon the Anatomy of the Roots of *Ophrydeæ*." By John Lindley, Ph. D., F.R. and L.S., Prof. Bot. University College.

The object of the author in this paper was to show that salep, the prepared roots of certain *Ophrydeæ*, is not a substance consisting principally of starch, as is the common opinion among writers of the present day, but is composed of a bassorine-like matter, organized in a peculiar manner.

After stating the opinions of recent authorities, the author gives the results of his own microscopical examination of the tissue of recent and prepared roots, by which it appears that the tubercles of *Ophrydeæ* universally contain large cartilaginous nodules of a mucilaginous substance, not coloured by iodine, and a small quantity of the grains of starch, lying in the usual manner in the parenchyma which surround the nodules, and readily susceptible to the usual action of iodine. The tubercles of many South-African *Ophrydeæ* present when dried the appearance of bags filled with small pebbles, as if the epidermis had contracted over hard bodies in the inside. If a fresh root of *Satyrium pallidum* be divided transversely the cause of this appearance is explained, for with its soft parenchyma are mixed tough nodules, clear as water, and often twenty times as large as the cells which surround them. These nodules are easily separable, are tough like horn, and on being sliced appear to be perfectly homogeneous. They are scarcely soluble in cold water; when boiled they become tumid and partially dissolve into a transparent jelly. If exposed to the air they rapidly dry and become brown. The aqueous solution of iodine has no sensible effect upon them in their natural state.

On charring slices of some salep procured at Covent Garden, a coarse preparation of wild *Ophrydeæ*, the author found that the nodules apparently homogeneous were composed of extremely minute transparent cells, filled, as he supposed, with a secretion of the same refractive power as themselves, and adhering naturally to each other firmly; the double walls of the cells and intercellular spaces being only made apparent by the charring process. The author explains the error of those who have considered salep to consist chiefly of starch, by allusion to the mode of its preparation. The tubercles

are first parboiled and then dried, the effect of which is to dissolve what starch exists in the cells surrounding the nodules. The dissolved starch flows over the surface of the nodules, from which when dried it is undistinguishable, and consequently when iodine is applied to salep the mass appears to become iodide of starch. If the nodules, however, after this action of iodine, be removed, they are seen to retain their original vitreous lustre.

The author remarks that these nodules of *Ophrydeæ* are, as far as his observations extend, absent in the tubercles of the other tribes of *Orchidaceæ*.

Read, a paper entitled "Some Data towards a Botanical Geography of New Holland." By Dr. John Lhotsky, late of the Civil Service, Van Diemen's Land. Communicated by Prof. Don, Libr. L.S.

The author commences his paper with the observation, that it was the lot of Mr. Brown to become connected in an almost exclusive way with the Flora of New Holland, he having been the first to illustrate its vegetable riches in an extensive and philosophic manner. Notwithstanding the important discoveries since made, his remarks, and especially those upon the botanical geography of that country, (published nearly twenty years ago,) have been confirmed by subsequent observations. The great approximation towards the European Flora, in that part of the country first explored by the author, agrees perfectly with the following observation of Mr. Brown: "It appears that a much greater proportion of the *peculiarities* of the Australian Flora exist in this, which I have therefore called the *principal parallel* (between 33° and 35° S. latitude), and that many of them are nearly confined to it.*" The author proposes the following geographical division of the Flora of the south-eastern part of New Holland.

1st. *The coast vegetation.*—This class of vegetation clothes the almost moveable sand of the coast, and the rocks of sandstone of the coal formation, or skirts the ponds of salt or brackish water. *Epacris, Boronia, Lambertia, Astroloma, Xanthorrhæa, Hakea, Banksia*, &c. are the most characteristic genera, forming usually a dense shrubbery of stiff and harsh plants. Of trees, scarcely any but species of *Eucalyptus* are to be met with.

2nd. *Vegetation of the rocky gullies near the sea coast.*—Such localities are generally characterized by small creeks or springs of fresh-water, of which the localities of the former class are mostly devoid.

* General remarks, geographical and systematical, on the Botany of Terra Australis, p. 586.

Two palms, *Corypha australis* and *Seaforthia elegans*, and the wonder of Australian forests, *Doryanthes excelsa*, adorn these localities.

3rd. *The Argyle vegetation* characterizes those park-like spots, with their stately Eucalyptus trees growing at some distance from each other, with very little underwood, which have attracted the notice of travellers, from Tasman down to those of our times. The geological features of this region consist of various rocks, the sandstone of the coal formation excepted, which last never yields a good soil. The genera of this class of vegetation are various grasses, *Thlaspi*, *Cerastium*, *Thymus*, *Scandix*, *Hydrocotyle*, *Dianella*, *Exarrhena*, *Silene*, *Hypericum*, &c., many of them European forms, and soft juicy plants. Where this vegetation occurs are to be found some of the most advantageous parts of the colony for the purposes of grazing.

4th. *The Menero vegetation* comprehends the Flora of those extensive downs which extend on the east side of the Alps to the extent of more than a hundred miles, and which are capable of maintaining vast numbers of sheep and other cattle. These downs present a different aspect in different seasons, being in some covered with the most luxuriant herbage, which at other times is parched and dried up. Many genera of the preceding class occur in these localities, besides *Lythrum*, *Epilobium*, *Potentilla*, *Leucea*, *Rumex*, and other European genera. The author regrets that the season was too far advanced to examine the *Gramineæ* and *Cyperaceæ*, which abound in this region.

5th. *Alpine vegetation*.—This was traced by the author to the summit of Mount William the Fourth.* These mountains being very extensive, will yield a great harvest to future travellers. The few plants collected by the author in this first investigation were two species of *Gentiana*, *Mniarum*, *Sphagnum*, *Dracophyllum*, *Azeroe*, *Coprosma*, *Podolepis*, some of the latter genus being three feet high.

February 19.—The Lord Bishop of Norwich, President, in the Chair.

Read, "Extracts from Letters addressed to Dr. Royle, V.P.R. & F.L.S., Prof. Mat. Med., King's College." By Dr. Falconer, Superintendent of the Hon. E. I. C.'s Garden, Saharunpore.

Under date of January 24, 1837, from Saharunpore, Dr. Falconer gives a general report of the state of the garden.

"The *Bixa Orellana*," he remarks, "now flowers and fruits freely.

* According to a recent calculation, made from the degree of temperature at which water boiled on the top of this mountain (viz. 196°), it possesses an absolute height of 8000 feet, being by far the highest point reached hitherto by any traveller in Australia.

The umbelliferous flowered *Panax*, near the cinnamon tree, is now a large and lofty tree, and there are numbers of it all over the garden. The Bombay Mangoes and Leechees are abundant with us. The medicinal garden still gives the annual supply of Hyoscyamus, and the Canal nursery turns out about 2000 teaks. The Otaheite sugar cane, brought up by Colvin, is likely soon to spread all over the district; it has succeeded famously here, and I have now in preparation about a couple of beegahs of ground outside the garden for it. I am also preparing for sowing about twenty beegahs with upland Georgia cotton seed, which will undoubtedly be most successful; it ripens before the Bourbon cotton comes into flower. This last season I got a few pods of Egyptian cotton, of the garden growth; the seed only reached me on the 15th of July, six weeks at the least too late, and it did not all ripen before the frosts, but what did ripen was long, fine, and strong in the staple, and the pods large. I expect to have a better account of it at the end of this season. I have also some Peruvian seed to experiment on.

"The herbarium has been largely added to. The family of all others that has yielded most additions perhaps is the *Orchideæ*. There are upwards of thirty epiphytous species growing on the trees in the garden, and many more in the herbarium; some of them are most interesting additions: one of them is a triandrous *Dendrobium*, *D. normale*, Fal. The three anthers are not the only singularity about it. The flower is perfectly regular; the three sepals being exactly equal, as are also the three petals, which, although of the same length, are twice as broad as the sepals. The column is also symmetrical; and as there is no labellum, it is difficult when the flower is removed from the axis to find out which of the petals represents the lip. Further, and what is most interesting of all, it clearly shows what is the normal position of the supplementary anthers in the family. Lindley makes them alternate with the lateral petals; while Brown, from the structure of *Apostasia* and *Cypripedium*, states that they alternate with the lateral sepals, and belong to a different whorl from the fertile anther. In my plant it is most distinctly evident, both by a decurrent ridge on each filament and by transverse sections of the column at all heights down to its base, that the supplementary anthers have the same relative position as the usual fertile one, and in harmony with Lindley's formula. Further, I have another variety of the species, in which the column is sliced off in front as is usual in the genus, and then the labellar petal is invariably developed into a spurred lip, so that it would appear that in the family the irregularity of the lip is a state

of anamorphosis consequent on the imperfect development of the column, or *vice versâ*; in fact, that the deficiency of the one is abstracted to make up the excess of the other. Next I discovered another genus of the tribe *Gastrodiæ*, with a monophyllous perianth, the segments, sepals and petals being united for two-thirds of their length into a tube. I found it on Dhunoultee, and have called it *Gamoplexis*; it has the habit and look of an *Orobanche*. I have found also a magnificent Malaxideous genus, standing, when in flower, 9 feet. You never saw a more superb affair, with rich yellow flowers like the *Cyrtopera*. I have called it *Thysanochilus*. The seed-vessel has no ribs, and in one flower of it I found a plurality of stamens. I have several other new genera, which it would tire you to describe. Talking of Dhunoultee, I found Wallich's *Fraxinus floribunda* growing on the ridge half-way between it and Landour, close to the road. You remember the description you give of the irregularity of the *Paris polyphylla* in Wallich's Plantæ Asiaticæ,—I found the *Podophyllum Emodi* growing intermixed with it, and strange to say, as if bewitched with the same turn for vagaries, with every number of stamens from 6 to 10, and in almost every flower one filament bearing two anthers, and that filament invariably the one opposite the petiole of the flower-bearing leaf. In one flower I found the following irregularities: 6 petals, 10 anthers, 7 filaments, or stamens if you like; on one filament 3 anthers, on another 2, and the remaining 5 regular. Singular that it and the *Paris* should grow together and both so irregular."

Under date of January 26, 1838, from Cashmere, whither he had proceeded on a Botanic mission in connexion with Sir Alex. Burnes's Expedition, Dr. F. says, "I am now wintering in Cashmere, with the prospect before me of pushing across through Little Thibet towards the Kuenlun Mountains when the snow clears. I started from Loodiana, where, by the by, I got the *Butomus umbellatus* in flower and fruit, new, I believe, to the plains of India; and after a few days at Lahore, I marched on through the Punjab to Attock in the month of July; no rains and fearful heat in the sandy plains I went along. From the want of rain and my route being through an open plain I did not glean much in my march. The Flora is exactly that of the neighbourhood of Delhi; *Peganum Harmala* everywhere, with *Capparideæ, Crotolaria Bushia, Calotropis Hamiltonii, Alhagi Maurorum, Tamarix, Acacia modesta,* &c. &c. Near Lahore I got what I believe to be a new Asclepiadeous genus exactly intermediate between *Calotropis* and *Paratropis,* with the angular and saccate sinued corolla, membrane lipped anthers and

corona of the former, but the coronal leaflets cleft and the pollen masses oval and ventricose as in the latter, with other peculiar characters besides. It is a low, twining, small, fleshy, lance-leaved undershrub. I have called it provisionally *Eutropis*. It is in great abundance in the Punjab. I met with the Dhak (*Butea frondosa*) as far as the western bank of the Jhelum. The Flora begins to change at Rawul Pindee, which is elevated and continuous so on to the plain of Chuch, along the banks of the Attock. Here I first came on the famous Zuetoon, the wild olive, *Olea* —— ? and further on, at Hussan Abdal, I found Himalayan *Rubi* and a Cashmeer *Dianthus*, white flowered and new to you. Near Attock I joined the party, having marched hitherto alone. We halted at Attock, the dry arid hills of which have a peculiar vegetation. We crossed the noble Indus at Attock; a fearful ferry, in the rains the river running eight knots an hour. The lower part of the plain of Peshawur, where we now were, is sandy, and has exactly the Flora of the arid tracts of the Punjab; *Salsolas*, *Chenopodeæ*, *Alhagi*, *Calotropis*, *Peganum*, *Tamarix*, &c. But when we got to Peshawur, so much do the seasons differ that peaches were coming into fruit the 15th of August, and the Kurreel (*Capparis aphylla*) out of flower only lately. From Peshawur I made an excursion to Cohaut, and from thence to the Salt Hills and the valley of Rungush. In the Salt Hills I got a Stapeliaceous Asclepiad, unfortunately neither in flower nor fruit, very probably one of Wight's *Carallumas* or *Boucerosias*. Also the *Cassia obovata*, the Egyptian senna in flower. I had previously got the same plant from near Delhi, no doubt about the species; certainly not the *obtusa* of Roxb.; the legumes always crested over the bulge of the seeds. I got numerous other plants. From Peshawur Burnes started for Cabul, and Mackeson and I for Cashmeer. From Attock, Mackeson went by the straight military road, as he was on a military survey, while I made an attempt to run up the Indus into the hills. I got on three marches and was forcibly stopped at Durbund (look at Burnes's map) and threatened with rather rough usage. I then turned across the hills and rejoined my companion in the noble valley of Huzara. The vegetation along the banks of the Indus from Attock to Durbund surprised me much. It is quite that of the characteristic forms of the Deyra Dhoon, and taking difference of latitude and altitude into account, with the great distance westward, this might not have been looked for: *Grislea tomentosa*, *Rottlera tinctoria*, *Hastingia coccinea*, *Acacia Catechu*, *Holostemma*, &c. On the banks of the Indus, in the valley leading up to Cashmeer from Huzara, I found the *Dodonæa Burmanniana*. You remark in your notice of the *Sapindaceæ* its absence from the

Bengal and Hindoostan region. Its occurrence with a leap further north is remarkable. From Huzara we marched on by the Paklee road to Mosufferabad. Near Drumbur I came on the *Hovenia dulcis*. At Mosufferabad I got on a high ridge, and followed it on to Cashmeer, where we arrived early in October. It was now too late in the season to exhaust the Flora of the valley and neighbourhood, so I made up my mind to winter here and make a fresh start in spring. It would take pages to contain what I have observed about the Flora here, late as I came. It has several anomalies; few if any oaks descend on the northern side of the Peerpunjal into the valley. I have not seen one yet. I have selected oaks as a very characteristic type. The same holds with respect to the plants that are associated with the oaks, &c. about Mussourie. In the lake you see *Nelumbium* and *Euryale ferox*, growing along with *Menyanthes trifoliata*; and cotton, a poor sort, growing on the banks, while the sides of the bounding hills are skirted with pines. I got *Staphylea Emodi* growing along with *Ribes Grossularia* (your *Himalense*?), while it grows as you know at Mussourie on low slopes near Budraj. The *Prangos pabularia* grows in the valley. I found it most abundant on Ahatoong, a low trap hill on the valley, but it is not so vigorous a plant as in its Thibetian habitat. I expect in the summer to get as far north as lat. 36° at the least on the Kuenlun or Kara Korun range, a most desirable tract to explore, as it will be clear beyond Himalayan vegetation, partly characteristic of that of central Asia. I have already seen enough to convince me from a trip to the Thibet frontier to near Durass, that the Flora ahead will bear a close resemblance in many general relations to that of the Altai Mountains shown by Ledebour and yourself."

"Deosir, Cashmeer, June 20, 1838.

"I have written to you twice from Cashmeer. I have been going leisurely all round the valley, and into all the subordinate valleys which radiate on all sides from the great one. I have made many acquisitions. Among *Ranunculaceæ* I have got species of *Hepatica*, *Ceratocephalus*, and *Callianthemum*, all of which I believe to be new, and making up the very blanks you notice in your 'Illustrations.' Of *Callianthemum*, I have no knowledge, besides your quotation, but my plant has leaves with umbelliferous habit, 8 white strap-shaped clawed petals, with the nectariferous pore high up on the claw, and a *pendulous* ovulum. It cannot therefore be a *Ranunculus*, nor your *R. pimpinelloides*. Further, I have got a new Ranunculaceous genus, new unless Jacquemont has got it, having the habit of *Trollius* in its

leaves and mode of inflorescence, 8 herbaceous sepals, 24 strap-shaped petals, plane with no fovea at the claw, and solitary *transversely attached* ovula, being neither pendulous nor erect. It forms a transition from *Adonis* to the *Ranunculeæ*. This is another blank filled up in the desiderata so pointedly mentioned by you. I have called the genus *Chrysocyathus*. It grows intermixed with *Trollius*, 'inter nives deliquescentes,' and till I examined it I took it for a *Trollius*. I have got a new species of *Adoxa*, forming I believe the second of the genus, *A. inodora* (mihi), a larger plant than the *A. Moschatellina*, and with the lateral flower 12-androus, and 6 segments in the flowers. I have also a new *Epimedium*, a large handsome leaved herb, *E. hydaspidis* (mihi), and two species of *Alchemilla*. *Fritillaria imperialis*, the Crown Imperial of English gardens, grows wild in the lofty shady forests of Cashmeer. The Cashmerees regard it to be unlucky, and grow it only near musjids and over graves. *Fothergilla involucrata* (mihi), belonging to the *Hamamelideæ*, exists in vast abundance in Cashmeer, forming whole tracts of low jungle; —strange that it should not have been brought before either to you or to me. It occupies the place that the hazel (*Corylus Avellana*) does in England, and at a little distance does not look unlike it. Thus, *Hamamelideæ* are found at opposite ends of the Himalaya range, *Bucklandia* and *Sedgwickia* in Assam, and *Fothergilla* in Cashmeer, but none of the family have yet been met with in the intermediate tracts. *Prangos pabularia* I have found in vast abundance in several directions, but the Cashmerees do not know it for any useful purpose, except as a plant highly prized by Europeans. They sometimes use the roots to destroy worms, by steeping them in Dhaun fields as Calamus (*butch*) is used in Hindoostan. The *Umbelliferæ* have not come into fruit yet, so I do not know much of my new acquisitions, but I have got among others a species of *Turgenia*, a genus which I believe is new to the Himalayas. My brother wrote me that you were inquiring about Koot and Amomum. Koot is exported from Cashmere: it is a plant of the natural family of *Compositæ*, which has not yet come into flower, but I shall let you know about it hereafter. Amomum, Humama, or Amamoon, is not known in Cashmeer nor to be had at the Piensarees. I have got a magnificent species of *Ornithogallum* ?, with a scape 7 feet high: the Cashmerees call it Prustereen, and prize it highly as a culinary vegetable. I have had *Dodonæa* brought to me from above Jummos in the heart of the hills, growing along the banks of the Chenab. I mentioned to you in a former letter some of the anomalies I had met with in the absence of forms common elsewhere; not an oak, nor *Andromeda*,

Rhododendron arboreum, Mahonia nepalensis, &c., have I yet found, though so common in the hills elsewhere. I have got *Sparganium* (*carinatum*, mihi), *Butomus* and *Villarsia Nymphoides* from the jhils. A species of *Sagittaria* is used here as a Cashmeeree Salep, the natives collecting the roots as in China. The *Coniferæ* are, as to the eastward, 3 pines, 2 or 3 firs and Deodar, but I have not seen the *Cupressus torulosa*, the lofty cypress of the Mussourie hills."

ZOOLOGICAL SOCIETY.

July 24, 1838.—Thomas Bell, Esq., in the Chair.

A letter, addressed to the Secretary, was read, from Walter Paton, Esq., accompanying a donation to the Museum of an Indian Fowl, remarkable for having had one of its spurs engrafted upon its head. The spur, in consequence of its removal to a part in which the supply of arterial blood was greatly increased, had grown to an unnatural size, and hung down in crescentic shape, presenting a very singular appearance.

Mr. Martin brought before the Meeting a collection of Snakes procured by the Euphrates Expedition, which, at the request of the Chairman, he proceeded to notice in detail.

The first, he observed, appeared to be referable to the *Coluber Cliffordii*; it agreed in every respect with specimens of that snake from Trebizond, procured by Keith Abbott, Esq., except that its colours were more obscure. Of this species there were several specimens, young and adult.

The others he regarded as new, and described them as follows:

Coluber Chesneii. This species is allied to *Col. Hippocrepis*, but differs in the shape of the muzzle, (which is more acute,) in the figure and extent of the nasal and labial plates, and in the disposition of the markings.

The labial plates are small and numerous, and in one specimen several are divided.

The posterior frontals are small, and in one specimen are divided into two.

The anterior frontals are contracted.

The superciliary plates are convex;—the eyes are small.

The scales of the trunk are small, imbricate, and without a keel.

The head is pale yellowish brown, the plates beautifully freckled or finely marbled with dark brown: a brown band traverses the superciliary and vertical plates from eye to eye, and then descends on each side obliquely to the angle of the mouth. The labial plates are bordered with dusky brown or deep gray.

The ground colour of the body above is yellowish brown; a series of square spots of a brown, or olive brown colour, extend from the back of the neck, above the median dorsal line, to the end of the tail. On the sides of the neck begins a line of the same colour, which soon breaks into elongated narrow marks, which towards the middle of the body become confused, broken, and irregular.

The superior margins of the abdominal plates are tinged with gray or dusky brown.

The whole of the under surface of head, body, and tail, pale yellow.

Caudal plates, 69 pairs in one specimen, and 57 in another. Length of head and body, 1 foot 11 inches; of tail, $4\frac{3}{4}$ inches.

Coronella multicincta. Allied to the "Couleuvre à capuchon' but has the muzzle much shorter and rounder; it differs also in the distribution of the colours.

The head is broad, the eyes very small, the muzzle very short and blunt.

The head is gray, finely and closely marbled, and dotted with black; a ring of which colour encircles the neck. The ground colour of the trunk above is pale cinereous gray, barred with transverse marks of black, broadest in the middle, and having a disposition to assume the arrow-head form; they unite with the black of the abdomen alternately, so that their direction across the back is not directly transverse but obliquely so. Length of head and body, 1 foot, $1\frac{1}{2}$ inches; of tail, $2\frac{1}{2}$ inches.

Coronella modesta. Head small; muzzle short, but moderately pointed; eyes small. Scales of upper parts smooth and small; universal colour yellowish gray. A black band passes from eye to eye; a second crosses the *occiput*; and a third of a more decided tint encircles the back of the neck. In a specimen from Trebizond, procured by K. Abbott, Esq., the marks on the head are more obscure. Length of head and body, 9 inches; of tail, $2\frac{1}{2}$ inches.

Coronella pulchra. Head long, flat, and pointed at the muzzle; eyes moderate.

Scales small and smooth.

General ground colour ashy gray; the head above beautifully marbled and mottled with black; an irregular mark crosses each superciliary plate and extends upon the vertical; and a mark of the same character traverses each occipital, and extends upon the sides of the occiput. A black mark runs below the eye to the margin of the lips, and a second to the angle of the mouth; a series of blackish spots begins on the back of the neck, and runs down the back,

where they become larger, and often broken into a double alternating series; a line of smaller and deeper black spots runs along each side, and the upper margins of the abdominal plates also are irregularly mottled with black. The plates of the abdomen are minutely and obscurely freckled with dusky black. Length of head and body, 1 foot $1\frac{1}{2}$ inch; of tail, $3\frac{1}{2}$ inches.

Vipera Euphratica. Allied to *Vipera elegans*, but differs in the disposition of the plates around and between the nostrils, and in the style of its colouring. A large *fossa* indicates, as in *Vip. elegans*, the aperture of the nostrils, and within this a valve, only to be seen when the *fossa* is opened, stretches obliquely across, forming the posterior margin of the nasal canal, as it extends from the bottom of the *fossa*.

The rostral plate is large and rounded above; the muzzle is large and swollen; the eyes sunk, but are not overshadowed, as in *V. elegans*, by a single superciliary plate; the scales, however, which occupy its place, are somewhat larger than those covering the top of the skull between the eyes. A large elongated scale intervenes between the nasal cavity and the rostral plate. The scales between the nostrils are larger than those which succeed them; the labials are rather small, the fourth from the rostral being the largest—their number on each side is ten. The scales on the top of the head are small, keeled, subacute at the points; those of the trunk are large, flat, elongated, with rounded points, and narrowly keeled.

Subcaudal plates 47 pairs.

Body stout and robust, gradually tapering to the *apex* of the tail. The general colour of the upper surface is brownish gray, minutely freckled with black, the dots of which are more clustered on the sides, in some places, and at regular intervals, giving the appearance of obscure clouded *fasciæ*, or *nebulæ*. The plates of the under surface are pale yellow, obscurely mottled and dotted with dusky gray. Length of head and body, 4 feet 5 inches; of tail, $7\frac{1}{4}$ inches.

Two other snakes, one from India, the other from Antigua, were also described as follows:

Coluber Cantori. Eyes large; head broad; muzzle moderate; vertical plate broad, as are also the two occipital plates, and the anterior ocular on each side. Scales of body small, smooth, and closely imbricate.

Body deep, somewhat compressed and tapering.

General colour of upper surface glossy brownish black; a black spot below each eye, on the meeting edges of the 5th and 6th labial plates; a black line from the back of the eye to the angle of the

mouth, and a black band from the side of each occipital plate to the sides of the neck, where it ends abruptly.

Along the sides, for the anterior half of the body, a small whitish spot occurs at regular intervals, with a broad black spot below it; these marks become fainter and fainter, and at length disappear. The central line of the back, from the neck to the middle of the body, pale brown.

Abdomen yellowish white, becoming dusky as it proceeds; the posterior portion and the under surface of the tail being a little paler than the ground colour of the upper surface. Length of head and body, 1 foot 1 inch; of tail, $3\frac{1}{2}$ inches.

Mr. Martin observed, that Dr. Cantor, in honor of whom he named this Snake, had observed it in India; and, according to the observations of this gentleman, it did not attain much larger dimensions than those of the specimen exhibited.

Inhabits India.

The exact locality of the specimen exhibited unknown.

HERPETODRYAS PUNCTIFER. Head narrow, scarcely distinct from the body; muzzle short and pointed; eyes small; body stout and gradually tapering. Scales smooth, short, broad, and imbricate.

General colour pale brown. A dark brown line runs down the top of the head; a riband of dark brown, made up of diamond-shaped marks joined together, commences at the occiput, and runs down the middle of the back to the end of the tail, on which last it is a simple line; a brown riband, little darker than the ground colour, but narrowly margined with dark brown, begins behind each eye, but soon loses itself on the sides of the body. Every scale at its *apex* has two minute dots of chalk-white, which, if not examined through a lens, might lead to the idea of their being the indications of pores; they are, however, simply round little dots of opake white. Plates of abdomen pale yellowish white, irregularly and obscurely marked with a dusky tint.

The specific term *punctifer* is given in allusion to the two white points at the apex of each scale.

Inhabits Antigua.

GEOLOGICAL SOCIETY.

Dec. 9, 1838.—A paper on the "Phascolotherium," being the second part of the "Description of the Remains of Marsupial Mammalia from the Stonesfield Slate," by Richard Owen, Esq., F.G.S., was read.

Mr. Owen first gave a brief summary of the characters of the

"Thylacotherium," described in the first part of the memoir*, and which he conceives fully prove the mammiferous nature of that fossil. He stated, that the remains of the split condyles in the specimen demonstrate their original convex form, which is diametrically opposite to that which characterizes the same part in all reptiles and all ovipara;—that the size, figure and position of the coronoid process are such as were never yet witnessed in any except a zoophagous mammal endowed with a temporal muscle sufficiently developed to demand so extensive an attachment for working a powerful carnivorous jaw;—that the teeth, composed of dense ivory with crowns covered with a thick coat of enamel, are every where distinct from the substance of the jaw, but have two fangs deeply imbedded in it;—that these teeth, which belong to the molar series, are of two kinds; the hinder being bristled with five cusps, four of which are placed in pairs transversely across the crown of the teeth, and the anterior or false molars, having a different form, and only two or three cusps—characters never yet found united in the teeth of any other than a zoophagous mammiferous quadruped;—that the general form of the jaw corresponds with the preceding more essential indications of its mammiferous nature. Fully impressed with the value of these characters, as determining the class to which the fossils belonged, Mr. Owen stated, that he had sought in the next place for secondary characters which might reveal the group of mammalia to which the remains could be assigned, and that he had found in the modification of the angle of the jaw, combined with the form, structure and proportions of the teeth, sufficient evidence to induce him to believe, that the *Thylacotherium* was a marsupial quadruped.

Mr. Owen then recapitulated the objections against the mammiferous nature of the *Thylacotherian* jaws from their supposed imperfect state; and repeated his former assertion, that they are in a condition to enable these characters to be fully ascertained: he next reviewed, first the differences of opinion with respect to the actual structure of the jaw; and, secondly, to the interpretation of admitted appearances.

1. As respects the structure.—It has been asserted that the jaws must belong to cold-blooded vertebrata, because the articular surface is in the form of an entering angle; to which Mr. Owen replies, that the articular surface is supported on a convex condyle, which is met with in no other class of vertebrata except in the mammalia. Again, it is asserted, that the teeth are all of an uni-

* An abstract of the first part of Prof. Owen's memoir was given at p. 61 of the present volume.—Edit.

form structure, as in certain reptiles; but, on reference to the fossils, Mr. Owen states, it will be found that such is not the case, and that the actual difference in the structure of the teeth strongly supports the mammiferous theory of the fossils.

2. With respect to the argument founded on an interpretation of structure, which really exists, the author showed, that the *Thylacotherium*, having eleven molars on each side of the lower jaw is no objection to its mammiferous nature, because among the placental carnivora, the *Canis Megalotis* has constantly one more grinder on each side of the lower jaw than the usual number; because the *Chrysochlore* among the *Insectivora* has also eight instead of seven molars in each ramus of the lower jaw; and the *Myrmecobius*, among the Marsupialia, has nine molars on each side of the lower jaw; and because some of the insectivorous *Armadillos* and zoophagous *Cetacea* offer still more numerous and reptile-like teeth, with all the true and essential characters of the mammiferous class. The objection to the false molars having two fangs, Mr. Owen showed was futile, as the greater number of the spurious molars in every genus of the placental *feræ* have two fangs, and the whole of them in the Marsupialia. If the ascending ramus in the Stonesfield jaws had been absent, and with it the evidence of their mammiferous nature afforded by the condyloid, coronoid and angular processes, Mr. Owen stated, that he conceived the teeth alone would have given sufficient proof, especially in their double fangs, that the fossils do belong to the highest class of animals.

In reply to the objections founded on the double fangs of the *Basilosaurus*, Mr. Owen said, that the characters of that fossil not having been fully given, it is doubtful to what class the animal belonged; and, in answer to the opinion, that certain sharks have double fangs, he explained, that the widely bifurcate basis supporting the tooth of the shark, is no part of the actual tooth, but true bone, and ossified parts of the jaw itself, to which the tooth is anchylosed at one part, and the ligaments of connexion attached at the other. The form, depth and position of the sockets of the teeth in the *Thylacothere* are precisely similar to those in the small opossums. The colour of the fossils, Mr. Owen said, could be no objection to those acquainted with the diversity in this respect, which obtains in the fossil remains of Mammalia. Lastly, with respect to the *Thylacothere*, the author stated, that the only trace of compound structure is a mere vascular groove running along its lower margin, and that a similar structure is present in the corresponding part of the lower jaw of some species of opossum, of the *Wombat*, of the *Balæna antarctica*, and of the *Myrmecobius*, though the groove does

not reach so far forwards in this animal; and that a similar groove is present near the lower margin, but on the outer side of the jaw, in the *Sorex Indicus*.

Description of the Half Jaw of the Phascolotherium—This fossil is a right ramus of the lower jaw, having its internal or mesial surface exposed. It once formed the chief ornament of the private collection of Mr. Broderip, by whom it has since been liberally presented to the British Museum. It was described by Mr. Broderip in the Zoological Journal, and its distinction from the *Thylacotherium* clearly pointed out. The condyle of the jaw is entire, standing in bold relief, and presents the same form and degree of convexity as in the genera *Didelphys* and *Dasyurus*. In its being on a level with the molar teeth, it corresponds with the marsupial genera *Dasyurus* and *Thylacynus* as well as with the placental zoophaga. The general form and proportions of the coronoid process closely resemble those in zoophagous marsupials; but in the depth and form of the entering notch, between the process and the condyle, it corresponds most closely with the *Thylacynus*. Judging from the fractured surface of the inwardly reflected angle, that part had an extended oblique base, similar to the inflected angle of the *Thylacynus*. In the *Phascolotherium* the flattened inferior surface of the jaw, external to the fractured inflected angle, inclines outwards at an obtuse angle with the plane of the ascending ramus, and not at an acute angle, as in the *Thylacyne* and *Dasyurus;* but this difference is not one which approximates the fossil in question to any of the placental zoophaga; on the contrary, it is in the marsupial genus *Phascolomys*, where a precisely similar relation of the inferior flattened base to the elevated plate of the ascending ramus of the jaw is manifested. In the position of the dental foramen, the *Phascolothere*, like the *Thylacothere*, differs from all zoophagous marsupials, and the placental *ferœ;* but in the *Hypsiprymnus* and *Phascolomys*, marsupial herbivora, the orifice of the dental canal is situated, as in the Stonesfield fossils, very near the vertical line dropped from the last molar teeth. The form of the symphysis, in the *Phascolothere*, cannot be truly determined; but Mr. Owen is of opinion that it resembles the symphysis of the *Didelphys* more than that of the *Dasyurus* or *Thylacynus*.

Mr. Owen agrees with Mr. Broderip in assigning four incisors to each ramus of the lower jaw of the *Phascolothere*, as in the *Didelphys;* but in their scattered arrangement they resemble the incisors of the *Myrmecobius*. In the relative extent of the alveolar ridge occupied by the grinders, and in the proportions of the grinders to each other, espe-

cially the small size of the hindermost molar; the *Phascolothere* resembles the *Myrmecobius* more than it does the *Opossum*, *Dasyurus* or *Thylacynus*; but in the form of the crown, the molars of the fossil resemble the *Thylacynus* more closely than any other genus of marsupials. In the number of the grinders the *Phascolothere* resembles the *Opossum* and *Thylacine*, having four true and three false in each maxillary ramus; but the *molares veri* of the fossil differ from those of the *Opossum* and *Thylacothere* in wanting a pointed tubercle on the inner side of the middle large tubercle, and in the same transverse line with it, the place being occupied by a ridge which extends along the inner side of the base of the crown of the true molars, and projects a little beyond the anterior and posterior smaller cusps, giving the quinquecuspid appearance to the crown of the tooth. This ridge, which, in *Phascolotherium*, represents the inner cusps of the true molars in *Didelphys* and *Thylacotherium*, is wanting in *Thylacynus*, in which the true molars are more simple than in the *Phascolothere*, though hardly less distinguishable from the false molars. In the second true molar of the *Phascolothere*, the internal ridge is also obsolete at the base of the middle cusp, and this tooth presents a close resemblance to the corresponding tooth in the *Thylacine*; but in the *Thylacine* the two posterior molars increase in size, while in the *Phascolothere* they progressively diminish, as in the *Myrmecobius*. As the outer sides of the grinders in the jaw of the *Phascolothere* are imbedded in the matrix, we cannot be sure that there is not a smaller cuspidated ridge sloping down towards that side, as in the crowns of the teeth of the *Myrmecobius*. But, assuming that all the cusps of the teeth of the *Phascolothere* are exhibited in the fossil, still the crowns of these teeth resemble those of the *Thylacine* more than they do those of any placental *Insectivora* or *Phoca*, if even the form of the jaw permitted a comparison of it with that of any of the seal tribe. Connecting then the close resemblance which the molar teeth of the *Phascolotherium* bear to those of the *Thylacynus* with the similarities of the ascending ramus of the jaw, Mr. Owen is of opinion that the Stonesfield fossil was nearly allied to *Thylacynus*, and that its position in the marsupial series is between *Thylacynus* and *Didelphys*. With respect to the supposed compound structure of the jaw of the *Phascolotherium*, Mr. Owen is of opinion that, of the two linear impressions which have been mistaken for *harmoniæ* or toothless sutures, one, a faint shallow linear impression continued from between the antepenultimate and penultimate molars obliquely downwards and backwards to the foramen of the dental artery, is due to the pressure of a small

artery, and that the author possesses the jaw of a *Didelphys Virginiana* which exhibits a similar groove in the same place. Moreover, this groove in the *Phascolothere* does not occupy the same relative position as any of the contiguous margins of the opercular and dentary pieces of a reptile's jaw. The other impression in the jaw of the *Phascolotherium* is a deep groove continued from the anterior extremity of the fractured base of the inflected angle obliquely downwards to the broken surface of the anterior part of the jaw. Whether this line be due to a vascular impression, or an accidental fracture, is doubtful; but as the lower jaw of the *Wombat* presents an impression in the precisely corresponding situation, and which is undoubtedly due to the presence of an artery, Mr. Owen conceives that this impression is also natural in the *Phascolothere*, but equally unconnected with a compound structure of the jaw; for there is not any suture in the compound jaw of a reptile which occupies a corresponding situation.

The most numerous, the most characteristic, and the best marked sutures in the compound jaws of a reptile, are those which define the limits of the coronoid, articular, angular, and surangular pieces, and which are chiefly conspicuous on the inner side of the posterior part of the jaw. Now the corresponding surface of the jaw of the *Phascolothere* is entire; yet the smallest trace of sutures, or of any indication that the coronoid or articular processes were distinct pieces, cannot be detected; these processes are clearly and indisputably continuous, and confluent with the rest of the ramus of the jaw. So that where sutures ought to be visible, if the jaw of the *Phascolothere* were composite, there are none; and the hypothetical sutures that are apparent do not agree in position with any of the real sutures of an oviparous compound jaw.

Lastly, with reference to the philosophy of pronouncing judgment on the saurian nature of the Stonesfield fossils from the appearance of sutures, Mr. Owen offered one remark, the justness of which, he said would be obvious alike to those who were, and to those who were not, conversant with comparative anatomy. The accumulative evidence of the true nature of the Stonesfield fossils, afforded by the shape of the condyle, coronoid process, angle of the jaw, different kinds of teeth, shape of their crowns, double fangs, implantation in sockets,—the appearance, he repeated, presented by these important particulars cannot be due to accident; while those which favour the evidence of the compound structure of the jaw may arise from accidental circumstances.

Jan. 9, 1839.—A paper was read, entitled, "Observations on the Teeth of the Zeuglodon, Basilosaurus of Dr. Harlan," by Richard Owen, Esq., F.G.S.

During the recent discussions respecting the Stonesfield fossil jaws, one of the strongest arguments adduced and reiterated by M. de Blainville and others in support of their saurian nature, was founded on the presumed existence in America of a fossil reptile possessing teeth with double fangs, and called by Dr. Harlan the Basilosaurus. To the validity of this argument, Mr. Owen refused to assent, until the teeth of the American fossil had been subjected to a re-examination with an especial view to their alleged mode of implantation in the jaw; and until they had been submitted to the test of the microscopic investigation of their intimate structure with reference to the true affinities of the animal to which they belonged. The recent arrival of Dr. Harlan in England with the fossils, and the permission which he has liberally granted Mr. Owen of having the necessary sections made, have enabled him to determine the mammiferous nature of the fossil.

Among the parts of the Basilosaurus brought to England by Dr. Harlan, are two portions of bone belonging to the upper jaw; the larger of them contains three teeth; the other, the sockets of two teeth. In the larger specimen, the crowns of the teeth are more or less perfect, and they are compressed and conical, but with an obtuse apex. The longitudinal diameter of the middle, and most perfect one, is three inches, the transverse diameter one inch two lines, and the height above the alveolar process two inches and a half. The crown is transversely contracted in the middle, giving its horizontal section an hour-glass form; and the opposite wide longitudinal grooves which produce this shape, becoming deeper as the crown approaches the socket, at length meet and divide the root of the tooth into two separate fangs. The two teeth in the fore part of the jaw are smaller than the hinder tooth, and the anterior one appears to be of a simpler structure.

A worn-down tooth contained in another portion of jaw, Mr. Owen had sliced, and it presented the same hour-glass form, the crown being divided into two irregular, rounded lobes joined by a narrow isthmus or neck. The anterior lobe is placed obliquely, but the posterior parallel with the axis of the jaw. The isthmus increases in length as the tooth descends in the socket until the isthmus finally disappears, and the two portions of the tooth take on the character of separate fangs.

The sockets in the anterior fragment of the upper jaw are indistinct

and filled with hard calcareous matter, but a transverse horizontal section of the alveolar margin proves, that these sockets are single, and that the teeth lodged therein had single fangs. This fragment of the lower jaw thus confirms the evidence afforded by the fragments of the upper jaw, that the teeth in the Basilosaurus were of two kinds, the anterior being smaller and simpler in form and further from each other than those behind.

Mr. Owen then proceeds to compare the Basilosaurus with those animals which have their teeth lodged in distinct sockets, as the Sphyræna, and its congeners among fishes, the Plesiosauroid and Crocodilean Sauria, and the class Mammalia; but as there is no instance of either fish or reptile having teeth implanted by two fangs in a double socket, he commences his comparison of the Basilosaurus with those Mammalia which most nearly resemble the fossil in other respects. Among the zoophagous Cetacea the teeth are always similar as to form and structure, and are invariably implanted in the socket by a broad and simple basis, and they never have two fangs. Among the herbivorous Cetacea however, the structure, form, number and mode of implantation of the teeth differ considerably. In the Manatee, the molars have two long and separate fangs lodged in deep sockets, and the anterior teeth, when worn down, present a form of the crown similar to that of the Basilosaurus, but the opposite indentations are not so deep; and the entire grinding surface of the molars of the Manatee differs considerably from those of the Basilosaurus, the anterior supporting two transverse conical ridges, and the posterior three. The Dugong resembles more nearly the fossil in its molar teeth; the anterior ones being smaller and simpler than the posterior, and the complication of the latter being due to exactly the same kind of modification as in the Basiloraurus, viz. a transverse constriction of the crown. The posterior molar has its longitudinal diameter increased, and its transverse section approaches to the hour-glass figure, produced by opposite grooves. There is in this tooth also a tendency to the formation of a double fang, and the establishment of two centres of radiation for the calcigerous tubes of the ivory, but the double fang is probably never completed. The teeth in the Dugong moreover are not scattered as in the Basilosaurus.

Mr. Owen then briefly compared the teeth of the fossil with those of the Saurians, and stated that he had not found a single instance of agreement in the Basilosaurus with the known dental peculiarities of that class. From the Mosasaurus the teeth of the American fossil differ in being implanted freely in sockets and

not anchylosed to the substance of the jaw ; from the Ichthyosaurus and all the lacertine Sauria in being implanted in distinct sockets, and not in a continuous groove ; from the Plesiosaurus and crocodilean reptiles from the fangs not being simple and expanding as they descend, but double, diminishing in size as they sink in the socket, and becoming consolidated by the progressive deposition of dental substance from temporary pulp in progress of absorption. In the Enaliosauria and the Crocodilia, moreover, there are invariably two or more germs of new teeth in different stages of formation close to or contained within the cavity of the base of the protruded teeth ; but the Basilosaurus presents no trace of this characteristic Saurian structure. From the external characters only of the teeth, Mr. Owen therefore infers, that the fossil was a Mammifer of the cetaceous order, and intermediate to the herbivorous and piscivorous sections of that order, as it now stands in the Cuvierian system.

In consequence however of the Basilosaurus having been regarded as affording an exceptional example among Reptilia of teeth having two fangs, though contrary to all analogy, and as the other characters stated above may be considered by the same anatomists to be only exceptions, Mr. Owen procured sections of the teeth for microscopic examination of their intimate structure and for comparing it with that of the teeth of other animals.

In the Sphyræna and allied fossil fishes which are implanted in sockets, the teeth are characterized by a continuation of medullary canals, arranged in a beautifully reticulated manner, extending through the entire substance of the tooth, and affording innumerable centres of radiation to extremely fine calcigerous tubes.

In the Ichthyosaurus and Crocodile the pulp cavity is simple and central, as in Mammalia, and the calcigerous tubuli radiate from this centre to every part of the circumference of the tooth, to which they are generally at right angles. The crown of the tooth in these Saurians is covered with enamel, while that part of the tooth which is in the alveolus is surrounded with a thick layer of cortical substance. In the Dolphins which have simple conical teeth like the higher reptiles, the crown is also covered with enamel and the base with cæmentum. But in the Cachalot and Dugong the whole of the teeth is covered with cæmentum. In the Dugong this external layer presents the same characteristic radiated purkingian corpuscles or cells as in the cæmentum of the human teeth, and those of other animals ; but the cæmentum of the Dugong differs from that of the Pachyderms and Ruminants in being traversed by numerous calcigerous tubes, the corpuscles or cells being scattered in the interstices

of these tubes. Now the crowns of the teeth of the Basilosaurus evidently exhibit in many parts a thin investing layer of a substance distinct from the body or ivory of the tooth, and the microscopic examination of a thin layer of this substance proves it to possess the same characters as the cæmentum of the crown of the tooth of the Dugong. The entire substance of the ivory of the teeth consists of fine calcigerous tubes radiating from the centres of the two lobes, without any intermixture of coarser medullary tubes which characterize the teeth of the Iguanodon; or the slightest trace of the reticulated canals, which distinguish the texture of the teeth of the Sphyræna and its congeners. The calcigerous tubes undulate regularly, and also communicate with numerous minute cells arranged in concentric lines.

Thus, the microscopic characters of the texture of the teeth of the great Basilosaurus are strictly of a mammiferous nature, and confirm the inference respecting the position of the fossil in the natural system drawn from the external aspect of the teeth.

Mr. Owen then adduced further proofs of the mammiferous and cetaceous character of the Basilosaurus, from the structure of the vertebræ, from the great capacity of the canal for the spinal chord, and from the form and position of the transverse processes, which however present a greater vertical thickness than in the true Cetàcea, and approach in this respect to the vertebræ of the Dugong.

With respect to the other bones of the Basilosaurus, Mr. Owen stated, that the ribs in their excentric laminated structure are peculiar, and unlike those of any Mammal or Saurian. The hollow structure of the lower jaw of the Basilosaurus, which has been advanced as a proof of its saurian nature, Mr. Owen showed occurs also in the lower jaw of the Cachalot, and is therefore equally good for the cetaceous character of the fossil.

In the compressed shaft of the humerus, and its proportion to the vertebræ, the Basilosaurus again approximates to the true Cetacea, as much as it recedes from the Enaliosaurians; but in the expansion of the distal extremity and the form of the articular surface, this humerus stands alone; and no one can contemplate the comparative feebleness of this, the principal bone of the anterior extremity, without agreeing with Dr. Harlan, that the tail must have been the main organ of locomotion.

Mr. Owen proposes to substitute for the name of Basilosaurus that of Zeuglodon, suggested by the form of the posterior molars, which resemble two teeth tied or yoked together.

MISCELLANEOUS.

ON THE NATURE OF POLYPIDOMS.

M. H. Milne Edwards, in a valuable paper on the nature and growth of Polypidoms, published in the December number of the 'Ann. Scienc. Nat.', after relating numerous observations on the structure of the polypidoms in various tribes, concludes his able article in the following words :—" The various facts which we have examined seem to prove that the current opinion relative to the nature and to the mode of formation of the polypidoms is inaccurate, and that these bodies, far from always being external incrustations and without any organic connexion with the animals which produce them, are integral parts of these beings, and consist of an organized tissue, the substance of which becomes charged more or less with corneous or calcareous matter deposited at its base, and the nutrition of which is effected by intus-susception. In all these animals there is a tendency in the tegumentary and reproductive portion of the body to harden, but the degree this solidification reaches varies much, and this alone determines the differences which exist betweeen the species distinguished by zoologists under the names of *naked Polypes*, *Polypes with flexible polypidom*, *fleshy Polypes*, and *Polypes with stony polypidom*. The cartilaginous or stony polypidom of a *Sertularia* or of a *Zoanthus*, is not, as is usually stated, a habitation which these animals build; it is in some measure their membrane which forms the solid structure of their body, and which, in the same manner as the skeleton of vertebrate animals, assumes at one time a membranous form, at another a cartilaginous texture, and sometimes a condition in some degree osseous."

[A contrary opinion is taken by Dr. Johnston in his article on British Zoophytes, in the 'Mag. Zool. and Bot.' vol. i. p. 440. "Now when we trace the formation of this axis through the various genera, from its first appearance in the form of scattered crystalline spicula until it graduates into a solid continuous rod, we can scarcely doubt its inorganic and extravascular character; it is the crystallization of calcareous matter excreted by the living polypiferous bark, and once excreted, beyond their power to change it, excepting by the addition of material of the same quality."—Edit.]

COMPARISON OF THE STRUCTURE OF SUCCULENT PLANTS WITH THE *SIGILLARIÆ*.

M. Link exhibited at the meeting of the Berlin Academy on the 23rd of July, 1838, some drawings showing the structure of the stem of arborescent succulent plants, with reference to the alleged

similarity between them and the *Sigillariæ* of a former world. It is certainly remarkable that numerous layers of bark are deposited one on the other, far more so than in all other trees, and one consequence of this is that they compress each other into a flattened shape, and that the outer bark falls off. The cells, however, of the new layers are flatter than in general. The ligneous bundles pass from the wood to the scars of the leaves; and such a difference in the form of these scars on the outer bark and beneath it, as that observed by Ad. Brongniart in the *Sigillariæ*, was not perceptible. The wood is very thin, even in the thickest stems of succulent plants; the bark and pith very thick; they remain a long while succulent and then rot, so that their preservation among fossil bodies is very improbable.—*From the Bericht über Verhandlungen der königl. Preuss. Akad. zu Berlin.*

METEOROLOGICAL OBSERVATIONS FOR MARCH, 1839.

Chiswick.—March 1. Cloudy. 2. Very fine. 3. Foggy: fine. 4. Cold haze. 5. Bleak and cold. 6. Frosty. 7. Sharp frost. 8. Cloudy and cold. 9. Frosty: fine. 10. Frosty: cloudy. 11. Dry haze. 12. Frosty: hazy. 13. Hazy. 14, 15. Rain. 16. Fine. 17. Overcast. 18. Cold haze. 19. Cloudy: frosty at night. 20. Rain. 21. Cloudy: fine: rain. 22. Cloudy. 23, 24. Fine. 25. Overcast. 26. Dry haze. 27, 28. Showery. 29. Fine. 30. Cold dry haze. 31. Overcast: rain.

Boston.—March 1—3. Cloudy. 4. Fine. 5. Cloudy. 6. Cloudy: hail and snow early A.M.: more snow P.M. 7. Cloudy: snow early A.M. 8. Stormy with snow. 9—12. Fine. 13—15. Rain: rain early A.M. 16. Cloudy: rain early A.M. 17. Cloudy. 18. Cloudy: snow A.M. 19, 20. Cloudy. 21. Cloudy: rain A.M. 22—24. Cloudy. 25, 26. Fine. 27. Cloudy: rain early A.M.: rain A.M. 28. Cloudy: rain, hail, and snow with thunder and lightning P.M. 29—31. Fine.

Applegarth Manse, Dumfries-shire.—March 1. Occasional showers A.M.: heavy rain and wind P.M. 2. Fine spring day: little raw frost morning. 3. Clear day: wind rather piercing. 4. Cold and ungenial. 5. Cold: dry A.M.: slight snow P.M. 6. Calm cold day: frost keen. 7. The same: showers of snow P.M.: frost. 8. Cold and bleak: hills white: frost continued. 9. Frost continuing: mod. barometer falling. 10. Still frosty: fine day though cold. 11. Snow two inches deep: frost giving way. 12. Snow gone: very chill and slight frost. 13. Temperate: wet afternoon. 14. Damp day: rain in the evening. 15. Calm moist day: drizzling P.M. 16. Spring day, though somewhat raw: rain P.M. 17. Cold and stormy: hills white: frost P.M. 18. Quiet day: frost gone: drizzling P.M. 19. Frosty morning: moderate: cloudy P.M. 20. Moist all day: rain heavy P.M. 21. Mild spring day: occasional slight showers: wind. 22. Boisterous morning, with severe snow showers. 23. Unsettled weather: slight showers, with wind. 24. Still very changeable: occasional showers. 25. Showery: unsettled: snow on the hills. 26. Hoar-frost morning: ice a quarter of an inch thick: rain P.M. 27. Heavy rain A.M.: cleared up: rain again P.M. 28. Rainy morning: cleared up and was fine. 29. Cold drying day: threatening frost P.M. 30. Very cold and dry: cloudy P.M. 31. Cold: threatening rain came on P.M.

Sun, 25 days.
Rain, 15 days.
Frost, 10 days.
Snow, 6 days.
Wind southerly, 13 days.
—— easterly, 9 days.
—— northerly, 7 days.
Wind westerly, 2 days.
Calm, 9 days.
Moderate, 9 days.
Brisk, 8 days.
Strong breeze, 3 days.
Stormy, 2 days.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. ROBERTON; *by* Mr. THOMPSON *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. VEALL *at Boston, and by* Mr. DUNBAR *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1839. March.	Barometer.						Thermometer.									Wind.				Rain.				Dew-point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc.			Chiswick.		Boston. 8½ a.m.	Dumfries-shire.			London: Roy. Soc. 9 a.m.	Chiswick 1 p.m.	Bost.	Dumfries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	8½ p.m.	Fahr. 9 a.m.	Self-register. Max.	Min.	Max.	Min.		9a.m.	9p.m										
1.	30·030	30·045	29·892	29·54	29·75	29·60	46·3	47·7	39·7	50	39	44·0	44	44		E.	SW.	calm	SW.	·041	...	...	...	39
2.	29·868	30·012	29·886	29·40	29·88	30·08	45·7	46·3	42·8	57	38	44	41	36		SSE.	SW.	calm	SW.	...	...	...	...	39
3.	30·068	30·088	30·071	29·63	30·20	30·18	43·7	53·3	41·6	52	35	42	38	35		N.	NE.	calm	E.	...	...	...	...	40
4.	30·052	30·118	30·057	29·73	30·20	30·27	40·3	50·3	36·8	52	33	37·5	38	35½		NE.	NE.	E.	E.	...	...	...	...	36
5.	30·108	30·126	30·058	29·80	30·30	30·29	35·2	37·0	33·8	35	30	34	35½	33		NE.	NE.	calm	E.	...	...	...	...	32
6.	29·854	29·894	29·726	29·62	30·13	30·00	32·5	32·8	31·6	35	25	35	30	26		NE.	NE.	E.	E.	...	·06	...	1·18	29
7.	29·526	29·624	29·543	29·33	29·93	29·98	30·7	31·7	27·4	35	29	31	29½	25		NW.	NW.	E.	NE.	...	...	...	...	26
☾ 8.	29·748	29·981	29·769	29·48	30·04	30·16	32·2	34·7	30·0	38	21	31	30	25½		NW.	N.	E.	E.	...	...	...	...	28
9.	29·948	30·139	29·987	29·65	30·18	30·15	29·8	30·2	26·0	40	20	32	27	27		NNW.	NW.	calm	N.	...	...	...	...	25
10.	30·172	30·238	30·196	29·85	30·15	30·18	30·5	35·8	26·5	42	30	27·5	30	30		E.	SE.	NW.	SW.	...	...	...	...	23
11.	30·182	30·216	30·163	29·92	30·09	30·13	36·5	37·8	29·9	46	32	35	33	37½		E.	SE.	SE.	SE.	...	...	...	...	28
12.	30·074	30·114	30·064	29·84	30·15	30·10	35·4	36·3	32·8	47	37	35	36½	34		NE var.	SE.	E.	E.	...	...	...	...	29
13.	30·048	30·074	30·041	29·72	30·05	30·00	40·7	43·5	34·8	55	41	38	39½	41½		NE.	SE.	E.	SE.	·022	·30	·66	...	34
14.	30·014	30·076	30·023	29·64	30·00	29·90	45·7	50·2	40·7	55	44	40	40½	43		SE.	S.	E.	SE.	·216	·39	·47	0·28	36
● 15.	29·806	29·848	29·396	29·35	29·70	29·38	46·7	47·5	45·6	52	40	46	43½	42½		S.	SW.	S.	SSE.	·327	·29	·23	...	42
16.	29·260	29·314	29·261	28·80	29·29	29·42	46·8	50·8	42·3	54	36	45	42½	37		SW.	SW.	W.	NNW.	·250	·10	·56	...	43
17.	29·464	29·821	29·482	29·10	29·89	30·10	39·8	51·2	38·0	43	34	39	37	42		NE.	E.	calm	NbyE.	·044	...	·03	...	36
18.	29·880	30·021	29·805	29·53	30·12	30·05	35·8	41·0	34·8	37	27	35	36	36½		NW.	NE.	NE.	S by E.	...	...	...	...	33
19.	30·022	30·064	30·026	29·65	30·08	30·04	37·0	38·0	33·3	49	29	36	38½	40		W.	NW.	calm	WSW.	...	...	...	...	32
20.	29·968	30·003	29·712	29·56	29·80	29·53	41·2	41·7	36·2	49	41	37·5	40½	43		W.	SW.	calm	SSW.	...	·09	...	...	35
21.	29·616	29·651	29·601	29·15	29·64	29·51	46·7	48·2	41·2	56	40	46	42	39		W.	W.	calm	S.	·077	·07	...	...	40
☽ 22.	29·700	29·733	29·690	29·12	29·50	29·59	47·2	48·8	42·4	47	43	42	37½	40		SW.	W.	NW.	NW.	·016	...	·11	...	44
23.	29·700	29·717	29·661	29·18	29·43	29·50	50·5	51·2	44·3	55	45	47·5	46	41		S.	SW.	W.	W.	...	·07	...	...	43
24.	29·682	29·680	29·656	29·13	29·52	29·46	47·4	48·3	46·8	58	40	47·5	41	36		S.	W.	calm	SW.	·088	...	...	2·60	44
25.	29·648	29·706	29·634	29·08	29·48	29·65	47·7	49·3	41·8	53	37	44	39	36		S.	W.	W.	W.	...	·03	...	...	43
26.	29·810	29·946	29·771	29·40	29·95	29·78	44·2	45·2	41·7	52	39	40	35½	40½		NE.	E.	W.	S.	...	·05	...	...	39
27.	29·670	29·667	29·343	29·15	29·55	29·37	48·0	48·8	42·2	54	41	45·5	48	43½		S.	W.	S.	SW.	·044	·14	·14	...	42
28.	29·386	29·523	29·402	28·80	29·35	29·56	48·8	51·5	42·7	54	39	48	44	37		S.	NE.	calm	N by E.	·133	·20	·09	...	44
29.	29·454	29·448	29·419	29·10	29·66	29·77	43·7	53·2	40·3	47	31	42	37½	33		NNW.	NE.	calm	E.	·291	...	·30	...	42
○ 30.	29·762	29·800	29·770	29·45	29·68	29·75	41·2	45·7	35·0	45	37	40	35½	37		ENE.	NE.	E.	E.	...	...	...	...	35
31.	29·612	29·614	29·543	29·32	29·66	29·67	41·0	43·0	37·2	48	40	42	39½	37		E.	SE.	E.	ESE.	...	·16	...	...	37
Mean.	29·811	29·880	29·763	29·42	29·662	29·195	41·3	44·2	37·4	44·84	35·58	39·6	37·8	36·6						Sum. 1·549	1·95	2·59	4·06	Mean. 36·1

ANNALS OF NATURAL HISTORY.

XXIV.—*Remarks on the Generic Distribution of the British* Hydromyzidæ (Diptera). By A. H. Haliday.

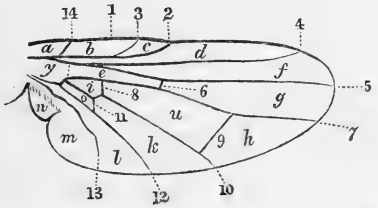
THE multitude of genera and species contained in the family *Muscidæ* makes it convenient to employ some intermediate divisions between the family and the genera. At the same time their affinities are so multiplied and intricate that few of the divisions which have been proposed can be considered as generally recognised. This is more particularly the case with the subdivisions of the third grand section *Acalypteræ*. Meigen has omitted all such intermediate steps, but the order of succession in which his genera are disposed supplies in part the deficiency. Fallen, R. Desvoidy, Macquart and Latreille have each proposed a general arrangement, but their methods vary considerably, and especially in this section of the family. Of the groups instituted, Fallen's tribe of *Hydromyzidæ* may be considered as one of the most established, being adopted by Latreille with very little alteration. None of this tribe, except the singularly formed *Musca Mantis* of DeGeer, had been described before the appearance of Fallen's Essay in the Stockholm Transactions for the year 1813, in which the tribe first assumed a distinct character and definite limits. The author has here described nineteen genuine species, and characterized most of the genera ultimately admitted. The *Dolichopidæ* were included with this tribe in the first sketch of his arrangement of Diptera, published three years before. How great an advance was made in the interval is evident. Latreille adds to the tribe the exotic genus *Ropalomera*, and excludes from it the type of Fallen's genus *Hydromyza*, *Musca livens* of Fabricius, referred to the *Cordyluræ* in accordance with Meigen's arrangement. There seems no reason to doubt that such is the true affinity of this insect, and it is only unfortunate that the typical generic name was appropriated by Fallen to the only extraneous species which he has admitted.

It is remarkable, that R. Desvoidy, who was not likely to be influenced by too much deference for the authority of his predecessors, has also placed with his *Hydrellideæ* a group of *Cordyluræ* less aberrant (than *C. livens*) from the ordinary character; the type of his genus *Nupharia* being the *C. fraterna* of Meigen. In other respects his method to some extent corroborates the distinction of this tribe, as his seventh family *Napæellæ* comprises, in addition to Fallen's *Hydromyzidæ*, only the *Sphæroceridæ* and some osculant species allied to these last, and is again divided into two groups. It is true, that he has drawn the line of separation between these so as to include in the latter the genus *Ephydra* of Fallen, disjoined from its more natural affinities—the remainder of the *Hydromyzidæ* constituting his first tribe *Hydrellideæ*. The origin of this discrepancy is to be sought in the principles of Desvoidy's system, which give a preference to partial knowledge or conjecture concerning habits and economy, as the basis of arrangement, over the study of (at least external) structure; with the exception of this particular, and of his habitual disregard of the labours of previous writers, this portion of Desvoidy's Essay is executed with judgement and precision, and as a generic arrangement of this tribe is second only to Fallen's. Macquart, remanding *Hydromyza* and *Nupharia* to their proper place among the *Cordyluræ*, has further limited the *Hydromyzidæ*, by rejecting all the species which have not the arista pectinate. These he has placed in his family *Piophilidæ*, in conjunction with many genera of diversified character and remote affinity.

I here employ the tribe as defined by Fallen in his 'Diptera Sueciæ,' removing *Hydromyza* to the *Scatomyzidæ*, and rejecting the addition of *Ropalomera*. The tribe thus limited is one of the most remote from the Calyptrate section, and can scarcely be confounded with any other group, unless it be with certain species of the *Geomyzidæ*, which appear to offer the nearest affinity. Nevertheless from these the *Hydromyzidæ* may be distinguished, either by the form of the head and mouth, the characteristic imperfection of the cells of the wing, or the total concealment of the ovipositor. The greater number frequent the neighbourhood of waters, a destination indi-

cated by the satiny lustre of the minute scales which clothe the face and sides. I consider as the type of the group the *Ephydra riparia*, the feet of which are formed peculiarly for resting on the surface of pools. The larvæ of most *Ephydræ* live among the semi-fluid green matter, which mantles on the surface of stagnant waters, or in the mud at the bottom. Desvoidy assumes, that the other genera of the family in their larva state are nourished by the living tissue of phanerogamous plants; but this view rests on conjecture and a solitary fact observed regarding a species of *Notiphila*. The firm and homogeneous texture of the face indicates but little sensibility to smells, from which we may probably conclude that the larvæ are not eminently saprophagous.

Fam. MUSCIDÆ.



AREOLETS OR CELLS.

a, humeral.
b, subcostal.
c, mediastinal or ulnar.
d, radial.
f, cubital.
y, radical.
e, præbrachial.
i, pobrachial.
o, anal.
u, discoidal.
g, *h*, *k*, external.
l, *m*, axillary.
n, axillary lobe.

NERVES.

1° *Excurrent or Main Nerves.*

1, costal.
2, subcostal.
3, mediastinal.
4, radial.
5, cubital.
7, præbrachial.
10, pobrachial.
12, anal.
13, axillary.

2° *Recurrent or Cross Nerves.*

14, humeral.
6, præbrachial.
8, pobrachial.
9, discoidal.
11, subanal.

Tribe HYDROMYZIDÆ, *Fall.*

Calyptra auricula interiore quasi nulla*. Nervus mediastinus cum subcostali connatus, alæ $\frac{1}{5}$ longitudinem vix pertingens.

* A little more apparent in *Ochthera*.

Areolæ pobrachialis et analis perparvæ, modo non semper incompletæ.*

Antennæ breves, articulo 1^mo^ *inconspicuo.*

Arista quasi exarticulata, non nisi dorso pectinata.

Facies convexa, absque foveolis membranaceis. Peristoma rotundatum. Mentum breve incrassatum. Tibiæ anticæ et posticæ setis lateralibus expertes. Ovidepositorium feminæ plane reconditum †.

Fallen in his 'Diptera Sueciæ' has divided this tribe into four genera, exclusive of *Hydromyza*. This number has been greatly multiplied by authors. All the genera added by Meigen appear to represent natural groups, but others equally distinct remain confounded among the numerous *Notiphilæ* and *Ephydræ*. I have therefore retained the groups proposed by him as well as by Desvoidy, adding a few which seem to be denoted by characters of equal importance. I have not thought it necessary to give all these the rank of genera, but have reverted to the limited number employed by Fallen. One of his (*Psilopa*) has been degraded, as not materially differing from *Notiphila*. On the other hand, I have adopted the genus *Hydrellia* of Desvoidy, comprehending with it two allied groups unnoticed by him. I have not had occasion to refer much to Macquart; as his arrangement, where it departs from those before named, does not seem to be improved in consequence. It is rarely that this can be objected to any portion of his classical work. For the determination of the species, here as elsewhere, the Diptera of Europe by Meigen is the standard of reference. Macquart has added some to the number, and Desvoidy has described several *Notiphilæ*, *Hydrelliæ* and *Hydrynæ*, apparently unnoticed by either.

Generum Synopsis.

Femora antica.

{ ovata incrassata, subæqualia; ..... 1. Ochthera.

* For an exception see *Ephydra nasica*. The imperfection of the same areolets is a character of the *Oscinidæ* also; but in that tribe they become incomplete after attaining their full development in the *Loxoceridæ*. This appears as well from the indication of their limit in the thickening of the nervures and the corresponding divarication of the radial and cubital nerves, as from the analogy of the last named tribe.

† There is a slight exception in the subgenera *Glenanthe* and *Teichomyza*.

Oculi { velutino-pilosi, glabri s. vage pubescentes; antennæ articulo 2^do... { unguiculato, ... 2. Notiphila. exunguiculato, ... 4. Ephydra. } ..... 3. Hydrellia.

Gen. 1. OCHTHERA, *Latr.*

Pedes antici femoribus crassis ovatis, tibiis arcuatis acutis. Metatarsus posticus incrassatus. Areola prima exterior apice attenuata. Nervus discoidali-recurrens obliquatus. Corpus vix nisi nudum. Caput subtus attenuatum, subtrigonum: vertex impressus: oculi magni protuberantes: clypeus exertus, suborbiculatus. Palpi exerti dilatati. Arista dorso ciliis perpaucis pectinata. Abdomen deplanatum.

Sp. 1. *Mantis*, O: nigra submetallica, abdominis margine albopunctato.

Latr. Hist. Nat. xiv. 391. Gen. Cr. Ins. iv. 347. tab. xv. fig. 10. Meig. D. Eur. vi. 78. tab. 58. fig. 18—21. Macq. S. à B. ii. 519. pl. xxi. fig. 7.—*Musca id.* DeGeer. Mém. vi. 143. pl. viii. fig. 15, 16.—*Musca manicata.* Fabr. Ent. Syst. iv. 334.—*Tephritis id.* Fabr. Antl. 323.—*Ochthera id.* Fallen Act. Holm. 1813. p. 244.—*Hydrom.* 2. Desv. Myod. 787.

In marshes, from Dorsetshire to the Isle of Skye, and westward to the wilds of Connemara.

Gen. 2. NOTIPHILA, *Fall.*

Caput oblatum. Oculi subglabri. Antennæ articulo 2° incrassato unguiculato; arista dorso pectinata. Mentum parum incrassatum. Alæ plerumque unguiculatæ.

Subgenerum Synopsis.

Nervus costalis
- alæ apicem ambiens; alæ
  - planæ; proboscis
    - unigeniculata; abdomen
      - 5-annulatum; antennæ articulo 3°
        - oblongo, ... 5. Hygrella.
        - suborbiculato, ... 6. Discocerina.
      - quasi 3-annulatum, ... 4. Trimerina.
    - bigeniculata, ... 7. Hecamede.
  - postice deflexæ, ... 3. Discomyza.
- in alæ apice desinens; abdomen
  - maris apice spinosum, ... 2. Dichæta.
  - inerme, ... 1. Notiphila.

Subg. 1. Notiphila.

Nervus costalis in alæ apice evanescens. Tibiæ mediæ extrorsum spinosæ. Facies perpendicularis lateribus ciliata. Palpi dilatati. Abdomen depressum inerme.

Sp. 1. *cinerea*, N: thorace ferruginoso, abdomine cinereo nigro-maculato, facie fulvescente, palpis tibiis tarsisque ferrugineis.

Fallen Act. Holm. 1813. p. 250.—*Hydrom.* 8. Meig. Dipt. Eur. vi. 65. Macq. S. à B. ii. 521. pl. xxi. fig. 9.—*Keratocera palustris*, Desv. Myod. 88.—*K. trapæ & fulvicornis*, Ibid. 78. 9.

Everywhere abundant in marshes. Desvoidy has observed that it deposits its eggs in the flowers of *Potamogeton*.

Sp. 2. *riparia*, N: thorace ferruginoso, abdomine cinereo nigro-maculato, facie cinerea, palpis tibiis tarsisque ferrugineis, tibiis annulo nigro.

Meig. Dipt. Eur. vi. 65. Macq. S. à B. ii. 522.

Found on the borders of the lake at Blarney Castle, county Cork.

Sp. 3. *uliginosa* (Curtis App.), N: thorace ferruginoso, abdomine cinereo nigro-maculato, facie fulvescente, palpis pedibus nigris, tarsis ferrugineis; *m. f.* 2 lin.

In a marsh between Glengariff and Adrighoule; banks of the Shannon at Tarbert; shores of Belfast Lough, much less common than the first species.

Antennæ and palpi black. Face tawny yellow. Frontals dull black. Vertex, orbits, and thorax rusty brown. Abdomen cinereous, with a blackish spot at the sides of each segment. Legs black, the tarsi (at least the two hinder pair) ferruginous. Halteres yellowish. Wings obscurely hyaline.

Subg. 2. Dichæta, *Meig.*

Abdomen maris convexum, apice bispinosum segmento penultimo margine pectinato. Characteres reliqui fere quales *Notiphilæ*.

Sp. 4. *caudata*, N: D: nigra obscura, facie fulvescente, tarsis ferrugineis.

Fallen Act. Holm. 1813. p. 249. Hydrom. 8.—*Dichæta id.* Meig. Dipt. Eur. vi. 62. tab. 58. fig. 1—6. Macq. S. à B. ii. 521. pl. xxi. fig. 8.

Found in England. Communicated by F. Walker, Esq.

Subg. 3. Discomyza, *Meig.*

Alæ abdomen non superantes, postice decurvæ. Tibiæ mediæ

nisi apice nudæ. Corpus depressum. Facies latissima rugosa. Abdomen 4-annulatum, orbiculatum, planum, subdeflexum.

Sp. 5. *incurva*, N: Discom: nigra tarsis posterioribus antennisque luteis.

Psilopa id. Fallen, Hydrom. 6.—*Discomyza id.* Meig. Dipt. Eur. vi. 76. tab. 58. fig. 14—17. Macq. S. à B. ii. 529. pl. xxi. fig. 13.

Found on the wooded cliffs about Isle-oronsay in Skye; September. Runs swiftly, but scarcely flies.

Subg. 4. Trimerina, *Macq.*

Tibiæ mediæ nisi apice inermes. Alæ planæ abdomen non superantes. Abdomen marginatum quasi 3-annulatum, *i.e.* segmentis 1° et 5° minimis, tribus intermediis magnis. Facies perpendicularis. Antennæ articulo 3° oblongo.

Sp. 6. *Madizans*, N: Tr: nigricans submetallica, antennis femoribus anticis pedibusque posterioribus rufis.

Fallen, Act. Holm. 1813. p. 252. Meig. Dipt. Eur. vi. 74. Ent. Mag. i. 178.—*Psilopa id.* Fallen, Hydrom. 7.—*Trimerina id.* Macq. S. à B. ii. 529.

Not uncommon on grassy banks, running actively and flying little.

Subg. 5. Hygrella.

Tibiæ mediæ nisi apice nudæ. Abdomen immarginatum segmentis 5 subæqualibus. Alæ abdomen superantes. Facies perpendicularis, lateribus ciliata. Antennæ articulo 3° oblongo deflexo.

Sp. 7. *nitidula*, N: H: obscure ænea, antennis tibiis tarsisque posterioribus ferrugineis, alis hyalinis.

Fallen, Act. Holm. 1813. p. 252. Meig. Dipt. Eur. vi. 75.—*Psilopa id.* Fallen, Hydrom. 7.—*Notiphila comta.* Meig. Dipt. Eur. vi. 68.—*Hydrellia id.* Macq. S. à B. ii. 524.—*Keratocera viridescens.* Desv. Myod. 790?

England; communicated by F. Walker.

Sp. 8. *leucostoma*, N: H: obscure ænea, antennis pedibusque ferrugineis, alis hyalinis nervo transverso fusco-cincto.

Meig. Dipt. Eur. vi. 68. tab. 58. fig. 12.—*Hydrellia id.* Macq. S. à B. ii. 524.

Common among aquatic plants.

Subg. 6. Discocerina, *Macq.*

Tibiæ mediæ nisi apice nudæ. Alæ planæ. Facies medio convexa lateribus ciliata. Antennæ articulo 3° suborbiculato. Proboscis basi tantum geniculata.

* *Clypeus subexertus brevissimus.*

Sp. 9. *obscurella*, N : Discoc : nigricans, fronte thoraceque cinerascentibus, facie exalbida, tarsis ferrugineis.

Notiphila nigrina. Meig. Dipt. Eur. vi. 69.—*Hydrellia id.* Macq. S. à B. ii. 524.

Var. β. Antennis subtus et fronte antice ferrugineis.

Notiphila obscurella? Fallen, Act. Holm. 1813. p. 251. Hydrom. 10. Meig. Dipt. Eur. vi. 73.

Var. γ. Minor, thorace fusco, pedibus fere totis nigris.

Common in moist grassy places; *var.* β. rare.

Sp. 10. *calceata*, N: Discoc : nigra subnitida, tarsis basi flavis, scutelli disco subglabro.

Meig. Dipt. Eur. vi. 69.

Not rare about streams.

Sp. 11. *pulicaria*, N : Discoc : nigra, tarsis fuscis, scutello pubescente; nervo pobrachiali non abbreviato. 1 lin.

A minute species, with the wings scarcely exceeding the abdomen; the base of the costal nerve more bristly and the radial rather shorter than in the others: the pobrachial scarcely abbreviate. Arista with only four or five hairs. Thorax and scutellum pubescent. Extremity of the abdomen glossy. Club of the halteres white. Wings obscure hyaline.

Not common; mostly found on windows.

** *Clypeus exertus inflexus subquadratus.*

Sp. 12. *glabra*, N : Discoc : nigra nitida, tarsis basi flavis, alis hyalinis, halteribus fuscis.

Meig. Dipt. Eur. vi. 69.—*Discocerina id.* Macq. S. à B. ii. 528.

England. Communicated by F. Walker.

Subg. 7. Hecamede, *Curt. Guide, App.*

Tibiæ nisi apice nudæ. Facies tuberculata. Oculi a peristomate distantes. Proboscis bigeniculata. Antenna articulo 3° orbiculato. Abdomen planum subdeflexum 4-annulatum, ventre toto coriaceo haud insecto. Alæ abdomen non superantes.

Sp. 13. *albicans*, N : Hec : albida, facie puncto nigro antennis tibiis tarsisque flavis.

Meig. Dipt. Eur. vi. 65. Macq. S. à B. ii. 522.

On sandy coasts, especially on fresh marine rejectamenta; runs fast and does not fly readily.

[To be continued.]

XXV.—*On* Ranunculus aquatilis *of Smith.* By Charles C. Babington, M.A., F.L.S., F.G.S., &c.

Owing to the respect in which Sir J. E. Smith is justly held by English botanists, the plants included in the *Batrachian* section of the *Ranunculi* have been considered as forming only two species by all our native authors whose works have appeared since the publication of his 'Flora Britannica.' In that work, following the example of Linnæus, he describes *R. hederaceus* and *aquatilis* as distinct species, including under the latter four species of Ray (Syn. 249.) and Sibthorp (Fl. Oxon. 175.); and it is not a little surprising, that so bold an undertaking, as the destruction of three species, of authors so well known for their attention to the living plants, and for their discrimination of species (although, owing to the low state of descriptive botany, they may not have clearly defined their distinctive characters) should not have attracted more attention from the practical botanists of this country.

For several years I have taken every opportunity of studying these plants in their native waters, and am now fully convinced that *R. aquatilis*, *circinatus* and *fluviatilis* of Sibthorp are truly distinct species, having excellent and clearly distinguishable characters when examined in a living state, although the pressure required in their preparation causes their differences to be less remarkable when preserved in the herbarium. Upon reference to foreign books, it will be found that nearly all the more modern writers have divided the *R. aquatilis* of Smith into two or more species, but that owing to the difficulty of determining upon what characters dependence could be placed, it is only of late years that they have been correctly defined; and the sceptical have been strongly confirmed in their doubts by observing that the learned DeCandolle, who described two species (*R. aquatilis* and *pantothrix*) in his 'Systema', has again formed them into only one in his 'Prodromus'. This result might have been confidently predicted by any person who was well acquainted with the plants; for he has not mentioned a single character which is not extremely variable, founding his distinctions upon some of the leaves being tripartite, or all of them multifid, and upon the gla-

brous or hispid carpels; points in which each of the plants described below is found to vary, except that tripartite leaves have never been noticed in *R. circinatus*.

The idea that the different forms concerning which we are treating are caused by the plants being placed in stagnant or swiftly flowing water, or upon nearly dry land, was first, I believe, started by Mr. Woodward in Withering's arrangement, and adopted by Smith, DeCandolle, and others; but I have constantly observed *R. aquatilis* and *circinatus* inhabiting, side by side, the same stagnant muddy water, or the same pure and swiftly flowing brook, and yet remaining totally unaltered and remarkably different; I have also gathered *R. fluitans* in perfectly stagnant ditches, quite preserving its specific distinction, and am convinced that the form and mode of division of the leaves will be found to constitute plain and constant specific characters. I am confirmed in this view by Wallroth, who appears to have studied these plants with peculiar care, and by Gaudin, Mertens, Koch, Schlechtendal, Sturm, and others, who have kept the plants separate, and recorded observations similar to my own.

In *R. aquatilis* the submersed leaves (and sometimes, when growing upon mud, all the foliage) are divided into numerous capillary segments, which spread in all directions, so as to form a more or less spherical mass; in *R. circinatus* they are divided into capillary segments, but spread only in one plane, so as to present a thin flat surface with a well-defined circular outline, as if an additional quantity of parenchyma only was wanting to form them into an entire circular leaf, and they have not the slightest tendency to a spherical arrangement; they are also invariably sessile, that is, have only the amplexicaule sheath between their limb and the stem, whilst in *R. aquatilis* they have usually a distinct petiole interposed which is often much elongated. In *R. fluitans* the leaves are upon long petioles, and very much elongated, and repeatedly dichotomous, with a long interval between the forks, the divisions taking a parallel direction and not spreading into a spherical mass, nor yet remaining in one plane surface.

The persistent style also and the shape of the carpels ought to be attended to; in *R. aquatilis* the carpel is usually ovate,

and tipped by the short straight blunt persistent style; in *R. circinatus* the same part is semi-obovate, and the style is twice or three times the length of that of *R. aquatilis*, and is acute and placed upon the extreme point of the nearly straight side of the carpel, towards which it curves over; in *R. fluitans* it is more regularly ovate than in either of the others, and bears the short straight persistent blunt style below the top upon the straighter side of the carpel.

R. hederaceus is distinguished from these by the total want of capillary divided leaves, by having a truly creeping stem giving out roots from every joint, and its few (5—10) stamens; its flowers are usually very small, and the petals narrow and scarcely as long as the calyx; but I possess specimens which were floating upon deep water and whose roots did not reach the ground, in which the petals are broad and much longer than the calyx, yet agreeing in all other respects with this species.

I now proceed to the description of the species.

1. *R. aquatilis*, Linn. Caule natante, foliis submersis capillaceo-multifidis laciniis divergentibus undique patentibus, natantibus reniformibus tripartitis partitionibus lobatis, carpellis transversim rugosis subhispidis inæqualiter ovatis apicula terminali obtusa instructis.

R. aquatilis, *Wallr. Sched.* 282. *Gaud. Fl. Helv.* iii. 522. *Mertens et Koch, Deut. Fl.* iv. 148. *Koch, Syn.* 11. *Bluff. et Fing.* (ed. 2.) t. i. p. 2. 285. *Reich. Fl. excurs.* 719. *Drejer. Fl. Hafn.* 191.

α. heterophyllus, Wallr. Foliis emersis reniformibus.

R. aquatilis, *Raii Syn.* (ed. 3.) 249. *Eng. Bot.* 101.

R. aquatilis, *α*, *Linn. Sp. Pl.* 781. *Sm. Fl. Br.* ii. 596. *Eng. Fl.* iii. 54. *Hooker, Br. Fl.* (ed. 4.) 218. *DC. Syst.* i. 234. *Prod.* i. 26.

R. heterophyllus, *Sibth. Fl. Oxon.* 175.

β. pantothrix. Foliis omnibus capillaceo-multifidis.

R. aquatilis omnino tenuifolius. *Ray*, 249.

R. aquatilis, *γ*, *Lison.* 782.

R. aquatilis, *Sibth.* 175.

R. aquatilis, *β*. *Sm. Fl. Br.* ii. 596. *Engl. Fl.* iii. 54.

R. aquatilis, *ε* et *ζ*, *Koch, Syn.* 11.

a. capillaceus, Wallr. Caule natante.

R. pantothrix, *a*, capillaceus, *DC. Sys.* i. 235.
R. aquatilis, *β*, capillaceus, *DC. Prod.* i. 26.
R. capillaceus, "*Thuil.*" *Lois. Fl. Gall.* i. 391.
b. cæspitosus. Caulibus erectis brevibus.
R. pantothrix, *β*, cæspitosus, *DC. Sys.* i. 236. (Syn. Sibth. excl.)
R. aquatilis, *γ*, cæspitosus, *DC. Prod.* i. 26.
R. cæspitosus, "*Thuil.*" *Lois.* i, 391.
R. Bauhinii, *Tausch in Ann. Sc. Nat.* (1835.) p. 57 ?
a and *β*, *a*. Frequent in ponds, ditches and streams.
β, *b*. On mud in places where water has stagnated, but afterwards disappeared.

Stems long, floating upon or near to the surface of the water, throwing out fibrous roots from its lower joints; in *var. β. b.* the stems are numerous, short, erect, much branched, slightly decumbent and rooting at the base, and thereby forming small dense upright tufts. Leaves all more or less stalked with a sheathing stipule-like base, when below the surface of the water divided into very numerous capillary segments, spreading in all directions from their base so as to form a spherical mass; when floating they are three-lobed, the lobes being two or three crenate, or divided into a similar number of segments, which are usually obtuse but sometimes acute; the intermediate lobe has usually three simple divisions, and the lateral ones two, each of which is often again slightly divided into two or three parts; in *var. β. a.* the leaves are all capillaceo-multifid, and in *var. β. b.*, from growing wholly in the air, the segments have a much greater tendency upwards, but still retain the divergent character of the species forming part of a sphere. In *var. a* a somewhat similar structure is sometimes noticed in the intermediate leaves, when growing in water, which is liable to great differences of level, so as to leave the plant at times nearly dry, but in that case the segments are flattened and linear with parallel sides, or slightly narrowed towards their point, and not setaceous. Flowers white, rising above the surface of the water, very variable in size. Petals white, with the base yellow, broad and blunt, with a naked nectariferous pore at their base, always longer than the sepals, which are deciduous, smooth, pale green, elegantly marked with numerous slender dark lines

near to their diaphanous white margins. Stamens numerous. Carpels in dense roundish heads, unequally ovate, tipped with the short obtuse persistent straight style, transversely wrinkled, usually, together with their torus minutely bristly.

2. *R. circinatus*, Sibth. Caule natante, foliis omnibus sessilibus capillaceo-multifidis laciniis in planum orbiculare dispositis teretiusculis abbreviatis 2—3-furcellatis, carpellis transversim rugosis glabriusculis gibboso-obovatis apicula laterali elongata arcuata acuta instructis.

R. aquaticus albus, circinatis tenuissime divisis foliis ex alis longis pediculis innixis. *Ray*, 249.

R. aquatilis, β. *Linn.* 781.

R. circinatus, *Sibth.* 175. *Reich.* 719. *Drejer*, 192.

R. aquatilis, γ. *Sm. Fl. Br.* ii. 596. *Eng. Fl.* iii. 54. (Syn. DC. excl.) *Hook.* 218.

R. aquatilis, δ. stagnalis, *DC. Prod.* i. 27.

R. stagnatilis, *Wallr.* 285. (Syn. DC. excl.)

R. pantothrix, β. *Gaud.* iii. 524.

R. divaricatus, *Koch*, 12. *Bluff. et Fing.* 285.

In still water and also in brooks and rivers, probably frequent. I have gathered it in the canal near Bath; in Henfield level, Sussex; in the river Soar near Leicester; in Reche load and near Cherry Hinton, Cambridgeshire.

Stems long, ascending, seldom spreading much near the surface of the water, throwing out a few long fibrous roots from the lower joints, after branching at all the joints, except a few of the upper ones. Leaves small, sessile, always immersed, having a brassy tinge, terminating below in a short slightly sheathing stipule-like base; the limb is divided into numerous, rigid, two, three, or four times forked, short, terete, capillary segments, all lying exactly in one plane, which has a very regular orbicular outline. Flowers large, similar to the last, but the sepals are much more deciduous, blunter, and have much narrower diaphanous margins. Carpels in dense roundish heads, semiobovate, laterally tipped by the long acute persistent incurved style, transversely wrinkled, usually glabrous, sometimes slightly bristly.

3. *R. fluitans*, Lam. Caule fluitante, foliis longe petiolatis repetito di- vel trichotomis, laciniis longissimis linearibus parallelis, f. superioribus subsessilibus, carpellis transversim rugosis glabris obovatis apicula laterali brevi obtusa recta instructis.

R. sive Polyanthemo aquatili albo affine, Millefolium, Maratriphyllon fluitans. *Ray*, 376.

R. aquatilis, δ. *Linn.* 782. *Sm. Fl. Br.* ii. 596. *Eng. Fl.* iii. 55.

R. fluitans, *Lam. Fl. Fr.* iii. 164. *Reich.* 719. *Koch*, 12. *Gaud.* iii. 525. *Bluff. et Fing.* 286. *Drej.* 192.

R. fluviatilis, *Sibth.* 176. *Wallr.* 284. *St. Amans, Fl. Agen.* (var. α.)

R. pantothrix, γ. peucedanifolius, *DC. Syst.* i. 236.

R. aquatilis, ε. peucedanifolius, *DC. Prod.* i. 27.

R. peucedanifolius, "*All. Ped.* No. 1469?" *Schlech. in Linnæa* (1831) 576. *Host.* ii. 118? *Lois.* i. 392.

In rivers and also in stagnant water. I have seen it in a perfectly stagnant ditch at Mildenhall, Suffolk.

Stems thick, very long, sometimes even twenty or thirty feet in length, floating near to the surface of the water, producing a few fibrous roots from the lower joints, branched; the internodes very long. Leaves, including their long petioles, from three inches to a foot or more in length, divided at long intervals in a di- or trichotomous manner, the segments very long, linear, rather flat and nearly parallel to each other; the upper leaves are often nearly sessile, and sometimes but rarely divided into a few short segments which are dilated towards their points, not linear or narrowed towards the point as in *R. aquatilis* when this structure occurs: very rarely upper floating leaves are found which are "half trifid, truncate, and broader than long": usually all the leaves have the same divided structure. The stipules are narrow, elongated, and inconspicuous, except in the upper part of the plant, where they are broad and sheathing. Flowers large, resembling those of *R. aquatilis*. Carpels obovate, slightly gibbous, laterally tipped by the short obtuse persistent straight style, transversely wrinkled, usually, as well as the torus, slightly bristly.

R. fluviatilis, Bigelow, 'Boston Flora,' 139, which Smith notices as a totally different species from this, is now referred by Torrey and Gray, 'Fl. of N. Amer.' i. 20. to *R. Purshii*, Rich., in 'Hook. Fl. Br.-Amer.'

It is probable that this species ought to have been called *R. peucedanifolius* after Allioni; but not being certain of the correctness of that synonym, I have adopted *R. fluitans*, Lam., as the next oldest and the most generally employed name.

St. John's Coll., Cambridge, March 18, 1839.

XXVI.—*On the Common Limpet* (Patella vulgaris), *considered as an article of food in the North of Ireland.* By Robert Patterson, Esq., Treasurer for the Belfast Museum.

In the month of May 1835, I passed some time in the vicinity of the sea-port town of Larne, county of Antrim, and could not avoid noticing the number of persons who were engaged at low water in collecting limpets. On inquiry I found that they were sought by many as an addition to their ordinary food; while others were employed in procuring them for sale. These people informed me, that ten women, inhabitants of the town of Larne, were thus occupied, and sold on an average four quarts of "the fish" daily. The word "fish" was invariably employed by them to designate the animal when removed from the shell; and about five pints of limpets as gathered from the rocks were required to produce one quart of "the fish," which was sold in Larne for twopence. Their average earnings would at this rate have amounted to about eight pence per day. At particular seasons, these people collect dullesh (*Rodomenia palmata*), and sloke or laver (*Porphyra vulgaris*, &c.), which are either sold in Larne or carried to other towns.

In the month of July 1837, I was again in the same locality, and renewed my inquiries on the subject. At this time very great and general distress prevailed in many parts of the kingdom, and the neighbourhood of Larne had not escaped. Those whose means did not enable them to purchase bread, were driven to extremities to procure food, and the productions offered by the beach, formed a natural, though very precarious resource. To some of these poor people the sabbath was not always a day of rest. Necessity drove them forth to collect the scanty repast which an examination of the rocks about the coast might afford. Of this I saw no instance at Larne, but further northward on the morning of Sunday the 25th of June 1837, I observed many persons thus occupied on a ledge of low rocks, lying between Cairnlough and Drumnasole. The absence of other employment and the scarcity of food, occasioned, as might be supposed, a great increase of the

limpet gatherers about Larne. Some of them stated their entire number to be above forty, and none estimated it at less than thirty. One ferryman assured me that nineteen people had in one day crossed in his boat to "Island Magee," to collect limpets on the more retired shores of that peninsula. They also seized with avidity any opportunity of visiting the Maiden Rocks, on which, as they are some miles distant from the coast, the limpets were plentiful, and were allowed to attain their full size.

From the greater number of persons employed about Larne and Island Magee, in searching for limpets, they were becoming towards the end of July difficult to be obtained, and that woman considered herself fortunate who could then earn by collecting them sixpence per day. The average of their earnings at that period would not, I was assured, much exceed fourpence. A rather anomalous circumstance must however be mentioned. Though the limpets were in greater demand than ever, the price did not advance; on the contrary, from the increased competition of the sellers, it fell from twopence to three halfpence per quart.

Some persons in the spring of 1837, were employed in gathering limpets so early as February, but few do so until the month of March is far advanced. In May "the fish" are in their prime, and on some parts of the County Down shore, the plumpness which they assume in this month is with great simplicity attributed to "the May dew." The season is over by the middle of August*. It may be regarded therefore as lasting for five months; or as the beginning and ending do not afford employment to the same number of people as the time when it is at its height, four months may be computed as the period of active exertion.

It would be difficult, or rather it would be quite impossible, to form any correct estimate of the quantity of limpets collected this season about Larne and the adjacent peninsula of "Island Magee." Some rude approximation to the result may however be obtained.

* On the 10th of Sept. 1838, when spending a day at Larne, I met one of my old friends the limpet gatherers, with her bag filled with limpets, which she had just been collecting for sale. The trade is therefore carried on later in the autumn than stated above.

It may be remarked, that almost no limpets are collected there on the Sundays or during severe weather. On the other hand, there are women and children who are in the habit of coming frequently to the rocks and collecting for their own use. The extra quantity withdrawn in the latter way, may fairly counterbalance the diminished consumption occasioned by the recurrence of the former causes; so that all these considerations may perhaps, without much error, be excluded from the following calculation.

Assuming that the smaller number of persons is the more correct, we have this year (1837) thirty individuals employed for four months or one hundred and twenty days, and selling daily four quarts of limpets. The total quantity thus sold would be 14,400 quarts, which at three halfpence per quart would amount to 83*l.* 15*s.* As however the rate at the commencement of the season was two pence, and that price was always obtained for "horned*" limpets, and for those sold in the country, the money actually realized would exceed 100*l.*

Three quarts of the boiled limpets were found by a friend to weigh 5 lb. 2 oz. Five quarts weighed in my presence gave 9 lbs. The average of our two trials gave a weight of 1 lb. 12 oz. to each quart. According to these data, the actual weight sold this season, would be 25,200 lbs. or eleven and a quarter tons.

The weight as carried from the beach is however much greater, for in addition to that of the animal, there is that of the shell, and of a small quantity of sea-water which it contains. I found that while five quarts of limpets weighed 9 lbs. the shells of the same "fish" weighed 13 lbs. making the total weight of the animals and their shells 22 lbs. If therefore 9 lbs. of the limpets amount with their shells to 22 lbs., the total quantity as before stated, 25,200 lbs. would give an aggregate of 61,600 lbs., or twenty seven and a half tons.

If we wish to know however the actual weight of the mollusca and their shells removed from the coast, we must recollect that whelks or periwinkles (*Turbo littoreus,* Linn.) are collected along with the limpets. These are sold in their shells

* The process of "horning" consists in seizing the head, from which, when boiled, the tentacula or "horns" invariably project, and pulling it from the body with the intestinal canal attached, thus freeing "the fish" from all impurities.

at one penny per quart*. In a large-sized can containing twenty quarts, the weight of the limpets was 22 lbs., that of the whelks 12 lbs. Whether the proportion of "whelks" may not have been greater than usual is uncertain. If however they constituted as in this case more than one third of the entire, we shall perhaps not be far wrong in stating, that the weight of whelks and limpets, as removed from the shore this season, could not have been less than forty tons.

As a natural sequel to the preceding observations, it may be interesting to glance at the consumption of some marine testacea as food in the adjoining county of Down. At Hollywood, four miles from Belfast, the coast is destitute of rocks, and consequently of limpets, but their absence is amply compensated by very extensive beds of muscles (*Mytilus edulis*), which supply an important article of diet to the poorer classes in the village. The shells are in general allowed to accumulate about their habitations until they become sufficiently numerous to fill a cart. They are then sold to lime-burners, who spread them on the lime at the top of their kilns, and consider that when thus placed they facilitate the combustion. Large quantities of muscles are carried by the poor venders into Belfast; and sometimes a boat laden at the muscle-bank, will discharge her cargo on one of the town wharfs, whence it is carted off and prepared for market.

At Bangor, six miles nearer to the entrance of the Lough, the shore becomes rocky with the occasional intervention of sandy bays. No one here makes a business of selling limpets, but many poor people are glad to collect them, to eke out their scanty repast. At Donaghadee, four miles distant, they are found in large quantities. Nor are they used merely as an article of human food; they become of some importance in the economy of the farm-yard as feeding for swine. After being removed from the shells, they are thrown back into the water in which they have been boiled; and with the addition of a little oaten meal, are regarded as nutritive and highly salutary. To such an extent does this conviction prevail among the small farmers living along the coast, that even

* Ten large sacks filled with "whelks" were lately landed on the quay at Belfast. My informant did not inquire from what part of the coast they had been collected.

when the limpets are retained as food for their household, "the brew" is carefully laid aside for their swine, especially if the animals appear at all sickly.

From Donaghadee to the entrance of Strangford Lough, limpets furnish to the humbler classes a valuable supply of food, and their general use is attested by the vast quantity of shells which may occasionally be seen about their dwellings. In conclusion it may be remarked, that oysters (*Ostrea edulis*) and cockles (*Cardium edule*) are found in such abundance in some parts of the County Down shore that they cannot be overlooked in any notice, however slight, of the marine testacea of that coast.

Additional Note.—By Robert Ball, Esq. of Dublin, I am informed that limpet shells are seen lying in prodigious heaps, about the very old round houses, in the south island of Arran. He does not think that limpets are consumed to the same extent by the present inhabitants of the island; they are in common use among the very poorest people on the coasts of Waterford and Cork.

XXVII.—*Extract from a Letter of* M. Lund *on the Fossil Mammifera discovered by him in Brazil**.

Lagoa Santa, Nov. 5, 1838.

Ever since my arrival in Brazil, five years ago, I have continued to devote my particular attention to the fossil vertebrate animals which abound in the caverns. You will have some idea when I tell you that I have already collected 75 distinct species of Mammifera alone, belonging to 43 genera, that is to say, equaling in number of species, and exceeding in genera, the animals which actually inhabit the same country. The portion of Brazil which I have most carefully investigated is comprised between the rivers of Rio das Velhas and the Rio Paraopeba. This country forms an elevated plain 2000 feet above the level of the sea, and is traversed in its centre by a chain of mountains 300—700 feet in height, which is formed of secondary limestone stratified in horizontal beds, and possessing all the characters of the Zechstein or Höhlen-Kalkstein of the Germans (cavern limestone). It is entirely perforated with caverns and traversed in all directions by fissures which are more or less filled with the red earth identical with that forming the superficial stratum of the di-

* From an extract given by Victor Audouin, to whom the letter was addressed, in the Comptes Rendus, No. 15, Avril 1839.

strict. This bed, which varies from 10 to 50 feet in thickness, covers indiscriminately and without interruption the plains, valleys, hills, and even the gentle slopes of the mountains. It consists principally of clay containing subordinate strata of gravel and quartz pebbles, and is frequently ferruginous to such a degree, that the particles of iron are converted into pistholitic iron ore resembling that which fills the fissures of the Jura.

The soil which fills the caverns has undergone some modifications, arising from its introduction and sojourn in them; 1st, it contains angulose or rounded fragments of limestone; 2nd, it is hardened by the particles of lime deposited in its interior by the waters charged with this substance filtrating through the fissures of the rock; 3rd, it is impregnated with saltpetre, and is on this account explored by the inhabitants of the country.

It is in this soil that the fossil bones are found; they are deposited pell-mell, are fragile, very white in their fracture, and adhere strongly to the tongue. Frequently they are petrified, more often converted into calcareous spar. In general they are broken or mutilated, and, lastly, they frequently bear the impressions of teeth, leaving no doubt that the animals to which they belonged had been dragged into these caverns by ferocious animals then inhabiting them. The larger ones have been introduced by various carnivorous Mammifera and the smaller ones by a diurnal bird.

At the present day not a single ferocious animal of the Mammifera sojourns in these caverns, and none accumulate masses of bones comparable to those we find in the diluvial deposits. At the utmost, we find in the modern excavations bones of small animals scattered at the surface, which had served as prey to a nocturnal bird, the Terror (Effraie) of Brazil, *Strix perlata*, Licht.

[We shall give the list of the fossils in one of our next numbers. —Edit.]

XXVIII.—*Notices of a Botanical Excursion to the Mountains of Ternova in Carniola.* By Edward Forbes, M.W.S.; For. Sec. B.S., &c.

In the chain of the Julian Alps, nearly opposite Goritzia, is a district called the Forest of Ternova, reserved by the Austrian government for the use of its navy, on account of the fine timber therein found. It consists of a group of well-wooded mountains, of from 4000 to 5000 feet above the level of the sea. The highest summits are bare and rocky, but the general form of the hills is round-backed. They rise from an elevated plain,

which itself is the summit of an extended elevation raised as it were on the high plain of the Karst.

My distinguished friend Mr. Tommasini, of Trieste, has for some time past been occupied with a Flora of Illyria, and these mountains have furnished him with some of its richest ornaments, they having been scarcely examined since the days of Scopoli. There still remained several elevations of the group to be explored, and as the promise of a good harvest was great, I gladly accepted the invitation of M. Tommasini to join him in an excursion to the unexplored part. Accordingly I met him at Goritzia on Tuesday, the 26th of June, and on the same day, with a proper stock of materials, botanical and gastronomical, vascula and bottles, boards, plates, bread and paper, we set off in a wicker cart for the mountains, our first object being to reach the village of Chapovano, in the heart of the forest (a distance of about 30 miles), by night. After following the course of the river Izonzo, remarkable for the white colour of its waters, we commenced ascending the mountains at about 6 miles from Goritzia. The point of ascent is the locality given by Reichenbach for the true *Athamanta Matthioli* of Wulfen, the only known locality, and there we found it. But assuredly it does not specifically differ from the *Athamanta rupestris* of Scopoli, which I had gathered the week before at its recorded habitat near Trieste. The differences arise from situation, and are in themselves scarcely sufficient to constitute a variety, much less a species. Had Reichenbach seen the two plants in their native stations he would doubtless have recognized their identity; but he has probably in this case, as in many others, been deceived by the fallacious experiment of cultivation; assuredly no test of specific character, as the fleeting difference of the field not unfrequently becomes (abnormally) permanent in the garden. Along with the *Athamanta* grew the *Phyteuma Scheuchzeri* and the *Dianthus monspeliacus*.

After rattling up and down several steep hills in our basket-like vehicle we changed it for ponies at a village a few miles beyond the church of Monte Santo, and commenced ascending again. On the way the Flora gradually changed from that of the Karst to a more alpine character, and the vegetation assumed a more northern aspect. *Phyteuma nigra*, certainly only a variety of *Phyteuma spicata*, which grew along with it,

ornamented the road side in company with *Cirsium serratuloides*. My companion was delighted to find *Scrophularia verna*, a plant much prized in his country. At Chapovano, our destination for the night, we found a tolerable village inn, and after a hearty supper of omelettes we slept soundly until 4 o'clock on Wednesday morning, when we proceeded to ascend the neighbouring mountain of the Stoddar. Our way lay up a steep slope, so covered with rare and beautiful plants that it resembled a garden run wild. All the colours of the rainbow were represented amid the grass, for the richest plants were in full flower. There were *Lilium carniolicum* and *bulbiferum*, with their gorgeous flame-coloured petals; the modest pink of *Hieracium incarnatum*; the bright yellow *Biscutella* and *Cineraria*; the blue of *Campanula carnica*; *Veronica prostrata* and the *Gladiole*, with its brilliant purple blossoms. Here and there *Cytisus angustifolius* waved its golden flowers above our heads, whilst *Aquilegia Sternbergii* flourished in its shade. Most of the plants I saw around me were new to me; for though the vegetation resembled *generically* that of the Valerian Alps of Switzerland, *specifically* it almost entirely differed. Every now and then however some well-known acquaintance, such as *Rhododendron ferrugineum* or *Tofieldia palustris*, reminded me of my alpine rambles. One of the rarest flowers which there grew was *Primula carniolica*, but its time of flowering was nearly over, and most of the specimens were in fruit. After recovering from the first shock of the novel and beautiful flora before me, my *Polygala*-hunting propensities came into full action. I sought and I found: for among quantities of *Polygala vulgaris* I discovered a few stalks of *Polygala austriaca*, and higher up the pretty plant grew in great plenty. It delighted my friend as much as myself, being an addition to the Flora of Carniola. Near the summit we found a new locality for one of the rarest plants in Europe, the *Pleurospermum Golaka*, a native of these mountains only; its time of flowering had not yet come. The summit itself was covered with bushes of *Rosa alpina* and *Spartium radiatum*, which only flourishes on mountain tops where the winds prevail. The view from the Stoddar is truly magnificent: in front the valley of Idria; behind the gigantic mountains of the Terglon, capped with perennial snows; far beneath and around, the thick forests of

Ternova and the fearful precipice of the Budanowitz, a mountain of great height, cleft as it were from its summit to its base, adds not a little to the grandeur of the scene. From the Stoddar we traversed the forest at a considerable elevation (about 3500 feet) to the Budanowitz, but had no small trouble with our guides and porters on the way. The peasantry of these mountains are Sclavonian and speak a dialect of that language; a very few know some words of Italian.

Much is said about travellers corrupting the virtue of the Swiss mountaineers, but certainly in knavery the Carniolian peasants excel them; they must be born knaves, as no travellers visit these mountains, and certainly no Englishmen. Yet although M. Tommasini spoke their language and knew their habits, they contrived to cheat, lie, beg, and annoy us throughout our excursion. They are as ugly as they are roguish.

In the forest we found *Cardamine bifolia* and *sylvatica*, three species of *Dentaria*, *Aremonia Agrimonioides*, *Omphalodes verna*, *Atragene alpina*, *Paederota Ageria*, *Carex firma*, *pedata*, *tenuis* and *mucronata*. The rare *Euphorbia carniolica* was also extremely abundant. On the Budanowitz we gathered *Gentiana Frolichii*, assuredly distinct from *Gentiana acaulis*, and not to be confounded with the variety of the latter called *angustifolia*, in Switzerland. Here also we obtained *Achillea Clavennæ*, *Saxifraga crustata*, *Orobus flaccidus*, *Kernera saxatilis*, *Astrantia carniolica*, *Salix Wulfenii*, *Apargia incana*, *Betonica Alopecurus* and *Polygala alpestris*. It is of importance to observe that in these mountains *Polygala alpestris*, *P. austriaca* and *P. vulgaris* all grow at the same elevation and *never* pass into each other. I regard them as truly distinct species.

We descended to a hamlet called Lagua, where we dined. On our way down we found *Sambucus racemosa*, *Primula elatior* (the true plant) in fruit, *Spiræa ulmifolia*, and *Arnica austriaca*; also a *Myrrhis* regarded by M. Tommasini as undescribed. From Lagua we journeyed on ponies through the forest to Doll, a small village distant 12 miles. Except *Pyrola uniflora*, here very rare, nothing of interest occurred on the way. Both Lagua and Doll are situated on the elevated table land of the forest. This table land is about 3000 feet and upwards above the level of the sea. At Doll we stopped and slept.

The object of our Thursday's excursion was to ascend the

highest mountains of the forest, namely the Golaks (385 toises high). Our guide was an old forester, but missing his way he misled us sadly, and I have seldom been obliged to scramble so much or so inconveniently as during the ascent of the Maligolak. Our scratched faces and torn clothes (travellers carry few coats) bore evidence of our toil for some time afterwards. The general aspect of the vegetation was similar to what we had seen the two preceding days, but several plants of great interest and novelty diversified it. In the wood we found *Lonicera cærulea* and *nigra*, *Hacquetia Epipactis* and *Salix Kitaibeliana*. Towards the summit of the Golaks *Pinus Mughus* grew in great plenty; also *Silene quadridentata*, *Carex capillaris*, *Apargia fœtida*, and that variety of *Gnaphalium dioicum* which Don named *Gnaphalium hyperboreum*. Though the weather was warm and the month June, in consequence of the lateness of the season, much snow lay around us, which we turned to good account by manufacturing ice-punch, being well provided with materials, wherewith to drink the health and happiness of Queen Victoria with all the honours, this being the coronation day. The snow was useful in another respect also, for in its neighbourhood we found *Gentiana angulosa* in beautiful flower, a great gratification to myself, as I had despaired of seeing its blossoms; hitherto all the specimens I had found were in fruit. We found no other plants of interest before descending to the Karst, when we gathered the beautiful *Campanula spicata* in fine condition, also *Geranium macrorrhizon* and *Anthriscus fumarioides*. The botanical part of our excursion was now at an end; and once more reclining in a wicker car, we jogged on to Goritzia, well loaded with treasures, and arrived there at midnight.

During this excursion I found but few land shells. *Helix verticellus* and *H. planospira* were common in the woods. Several good species of *Clausilia*, *Vitrina elongata*, and *Cyclostoma elegans* also occurred. The greatest rarities were a few specimens gathered on the summit of the Maligolak of two of the scarcest and most interesting European *Pupæ*, viz. *Pupa pagodula* and *Pupa Kokeilii*. The latter is a trochiform *Pupa* with a ringent mouth, and forms a natural link between *Pupa* and *Helix*; it was first described by Rossmassler, who received it from Carinthia about a year and a half ago.

XXIX.—*On the Wild Cattle of England.* By Sir Philip Grey Egerton, M.P., F.R.S., &c.

To the Editors of the Annals of Natural History.

Gentlemen,

As no mention was made in Mr. Hindmarsh's communication to the British Association at Newcastle, "On the Wild Cattle of Chillingham Park*," of the existence formerly of a breed of wild cattle at Bishops Auckland, the following extract may be worthy of record:—It is copied from a MS. in my possession, entitled, "The Second Yeares Travell. thorow Scottland and Ireland, 1635." The writer passes a few days on his road to Scotland "att Bishoppe-Auckland w^th^ Dr. Moreton, Bishoppe of Durham: who maintaines great hospitalitie, in an orderly well-governed house, and is a verye worthy Reverend Bishoppe." After describing the palace, "chapples," &c., he mentions "A daintie stately parke: where-in I saw wild bulls and kine: w^ch^ had 2 calves ruñers; there are about 20 wild beasts all white: will nott endure yo^r^ approach: butt if they bee enraged or distressed, verye violent and furious: their calves will bee wonderous fatt."

I have the honour to be
Your obedient servant,
Philip Grey Egerton.

XXX.—*On three undescribed Species of the Genus* Cimex, *closely allied to the Common Bed-Bug.* By the Rev. Leonard Jenyns, M.A., F.L.S., &c.†

[With a Plate.]

I am not aware that any entomologist has described more than one species of the genus *Cimex*, as restricted at the present day, although Latreille has alluded to a second, found on

* See Mr. Hindmarsh's paper, vol. ii. p. 282, which also contains notices of the existence of this breed at Hamilton, Lynn Park, Chartley Park; and formerly at Burton Constable, and Drumlanrig, with ancient descriptions of them from Hector Boethius and Bishop Leslie.

† Read to the Natural History Section of the British Association at Newcastle, August 23, 1838; and communicated by the Author.

swallows*, which he thought would prove to be distinct from the common bed-bug†. A year or two since I had occasion to destroy a great number of martins' nests, when I found them swarming with the species just alluded to, which on being compared with the *C. lectularius* of authors, offered several obvious differences. A short time afterwards I obtained a third species, equally distinct and equally well characterized, from the Pipistrelle bat, to which I can find no allusion whatever. And very lately I have been favoured by Mr. Westwood with specimens of a fourth species found on pigeons, which though often met with before, has not been generally considered as distinct from the one found in houses. I beg to draw the attention of entomologists to these three undescribed insects, which acquire an interest from their parasitic habits, beyond what they might possess on other accounts. As they are all closely allied to the common bed-bug which is so well known, I shall not enter into a detailed account of their characters; but merely point out the differential marks by which each is distinguished from the others as well as from the *C. lectularius* of authors. And I shall commence with the species found on pigeons, from its bearing a closer resemblance to the one just mentioned than either of the two others.

C. columbarius, Nob.

On comparing this species with the common house-bug, it will be found to be smaller and of a more orbicular form. The *antennæ* are shorter, and the joints not quite so slender; and the difference in length between the third and fourth joints not so considerable. The *thorax* is rather less hollowed out in front, the anterior angles less produced, and the sides less reflexed. The *abdomen* more nearly approaches to round, the lateral margins being very much curved, and the greatest breadth exactly in the middle; whereas in the house-bug the lateral margins are at first but little curved, and the greatest breadth rather behind the middle. The *colours*, as well as the

* Règ. Anim. (2nd edit.) tom. v. p. 201.

† There is also allusion to "the discovery of a new and winged species of *Cimex* (*C. domestica*)" by M. Schilling, in the "Journal of Proceedings of the Entomological Society of London," (vol. i. p. 4.) but neither its character nor its *habitat* are annexed.

punctures and the degree of pubescence, are similar in the two species.

C. Hirundinis, Nob.

This species is rather less than the *C. columbarius*, and in respect to form, different from both that and the *C. lectularius*. The *antennæ* are comparatively short, and the third joint is scarcely, if at all, longer than the fourth. The *eyes* are not so prominent. The *thorax* is much less hollowed out in front, the anterior angles but little produced, and the sides scarcely at all reflexed. The *scutellum* is wider at the base or more transverse, and does not project so far backwards. The *elytra* are less coarsely punctured. The *abdomen* is not so broad, and more rounded at the apex; the sides regularly curved. The whole insect is more pubescent. The *colour* is ferruginous inclining to testaceous, darker than in the common bed-bug; and the head and thorax are much clouded with fuscous. In one specimen the legs are spotted, at or near the joints, with this last colour. There are also some fuscous spots on the abdomen.

The young, or *pupæ*, have the abdomen much narrower than the perfect insect, inclining to oblong.

C. Pipistrelli, Nob.

The *antennæ* of this species are of an intermediate length between those of the *C. lectularius* and those of the *C. columbarius*; and the third joint is obviously longer than the fourth. The *eyes* are prominent. The *thorax* has a moderately deep excavation in front, and the sides are partially reflexed. The *abdomen* is narrower than in either of the above-named species, and much more attenuated posteriorly, the greatest breadth being rather before the middle. The *thighs* are more incrassated. The whole insect is very pubescent, approaching to hispid; and rather coarsely punctured. The *colour* is dark ferruginous-ochre, glistening with a faint metallic or subæneous hue, not perceptible in any of the other species. The legs and antennæ are a shade paler than the abdomen, and as well as this last, without spots.

I shall annex a synoptic view of the specific characters of

all the four species drawn up with reference to the above differences.

1. *C. lectularius.*—Ferrugineo-ochraceus : thorace profunde emarginato, lateribus reflexis : abdomine suborbiculato, apice acuto : antennis articulo tertio quarto longiore.

Long. $2\frac{1}{2}$ lin. *Hab.* In domibus.

2. *C. columbarius.* — Ferrugineo-ochraceus : thorace profunde emarginato, lateribus reflexis : abdomine orbiculato, apice subacuto : antennis articulo tertio quarto paulo longiore.

Long. vix $2\frac{1}{4}$ lin. *Hab.* In Columbis.

3. *C. Hirundinis.*—Fusco-ferrugineus : thorace leviter emarginato, lateribus planis : abdomine ovato, apice subacuto : antennis brevibus, articulis tertio et quarto subæqualibus.

Long. $1\frac{3}{4}$ lin. *Hab.* In nidis Hirundinis urbicæ.

4. *C. Pipistrelli.*—Ferrugineo-ochraceus, nitidus : thorace profunde emarginato, lateribus paulo reflexis : abdomine ovato, postice attenuato : antennis articulo tertio quarto longiore.

Long. 2 lin. *Hab.* In Vespertilione Pipistrello.

I have only to add, that the last two species were both taken in Cambridgeshire. Of the *C. Pipistrelli* I have seen but one specimen.

REFERENCE TO PLATE V.

Fig. 1. *C. columbarius.* Fig. 2. *C. Hirundinis.* Fig. 3. *C. Pipistrelli. a.* One of the antennæ. All the figures are highly magnified. The line above each denotes the natural size.

Swaffham Bulbeck, April 6, 1839.

XXXI.—*Floræ Insularum Novæ Zelandiæ Precursor; or a Specimen of the Botany of the Islands of New Zealand.* By Allan Cunningham, Esq.

[Continued from p. 115.]

ROSACEÆ, *Juss.*

Acœna, *Vahl.*

566. *A. Sanguisorbæ. Vahl Enum.* i. *p.* 294. *DC. Prodr.* ii. *p.* 592. *Rœm. et Sch. Syst. Veg.* i. *p.* 268.—Ancistrum Sanguisorbæ. *L. Willd. Sp. Pl.* i. *p.* 154.—A. diandrum. *Forst. Prodr. n.* 52. *A. Rich. Fl. Nov. Zel. p.* 341.

New Zealand (Middle Island). Dusky Bay.—1773, *G. Forster.* Cook's Strait.—1827, *D'Urville.* (Northern Island).—1769, *Sir Jos. Banks.* In dry exposed situations, Bay of Islands,—1826, *A. Cunningham.*

RUBUS, *L.*

567. *R. australis*, caule glabro teretiusculo, aculeis ramorum secundis recurvis, foliis ternatis quinatisve petiolatis, foliolis ellipticis ovatisve extra medium argute serratis, serraturis acuminatis coriaceis venosis utrinque glabris, floribus axillaribus racemosis dioicis, laciniis calycinis obtusis patentibus, pedunculis ramulisque tomentosis. *Forst. Prodr. n.* 224. *DC. Prodr.* ii. *p.* 556. *A. Rich. Fl. Nov. Zel. p.* 340.

Tataramora, indigenis.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Margins of forests, Wangaroa.—1826, *A. Cunningham.* (Middle Island).—1773, *G. Forster.*

568. *R. Schmidelioides*, caule glabro tereti, aculeis ramorum brevissimis sparsis revurvis, foliis ternatis petiolatis, foliolis ovalibus lato-ellipticisve coriaceis rugosis venosis extra medium serratis acutis basi rotundatis subcordatis supra viridibus lævibus, subtus pedunculis ramulisque ferrugineo-tomentosis, racemis axillaribus conferti floris brevibus paniculatis, floribus dioicis, calycibus obtusis lanatis.

New Zealand (Northern Island). Forests at Wangaroa and Bay of Islands.—1826, *A. Cunningham.*

Obs. Habitus præcedentis, sed differt foliolis omnino ternatis rugosis venosis subtus (discoloribus) valde ferrugineo-tomentosis, racemoque multo breviore.

569. *R. cissoides*; caule glabro tereti ramoque inermi, foliis ternatis quinatisve elliptico-lanceolatis lanceolatisve petiolatis acuminatis serratis basi rotundatis utrinque lævibus, petiolis costisve mediis retrorso-aculeatis, paniculis axillaribus terminalibusve glabriusculis laxis elongatis pendulis, calycinis laciniis ovatis obtusiusculis reflexis tomentosis.

New Zealand (Northern Island). Dense forests of Wangaroa.—1826, *A. Cunningham.*

Obs. Habitus omnino *Cissi. Folia* præsertim quinata longe petiolata, valde nitida et pulcherrime venosa, serraturis acuminatis. *Panicula* ramosa pedalis.

LEGUMINOSÆ, *Juss.*

1. EDWARDSIA, *Salisb.*

570. *E. microphylla*, foliolis 33—41, obovatis subrotundis villiosiusculis, carinæ petalis ellipticis, margine dorsali uncinato. *DC. Prodr.* ii. *p.* 97. *A. Rich. Fl. Nov. Zel. p.* 344.—Sophora microphylla. *Ait. Hort. Kew. ed.* 1. *v.* ii. *p.* 42. *Jacq. Hort. Schœnb.* iii. *t.* 269. *Bot. Mag. t.* 1442.

Kowhy or Kongi, indigenis.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Bay of Islands. 1826, *A. Cunningham.*

571. *E. grandiflora*, foliolis 17—21 oblongo-linearibus sublanceolatis villosiusculis carinæ petalis late falcatis. *DC. Prodr.* ii. *p.* 97.—Sophora tetraptera. *Ait. Hort. Kew. ed.* 1. *v.* ii. *p.* 43. *Curtis Bot. Mag. t.* 167.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.*

Quid *E. microphylla, Wenderoth in Linnæa*, v. *p.* 202. ex nova Zelandia, sec. *Endl.*?

2. Clianthus, *Sol. mss. in Bibl. Banks.*

Calyx late campanulatus subæqualis 5-dentatus. *Vexillum* acuminatum reflexum, alis parallelis longius; *Carina* scaphiformis, vexillo alisque multo longior, omnino monopetala. *Stamina* manifeste perigyna, diadelpha, omnia fertilia. *Stylus* staminibus duplo longior, versus apicem hinc leviter barbatus, stigmate simplicissimo. *Legumen* pedicellatum, coriaceum, acuminatum, ventricosum, polyspermum, intus lanulosum sutura dorsali recta, ventrali convexa. *Semina* reniformia, funiculis longiusculis affixa.

572. *C. puniceus*, suffruticosus diffusus glaber, foliolis alternis oblongis subemarginatis racemis pendulis multifloris, calyce quinquedentato, legumine glabro. *Lindl. in Bot. Reg.* 1775. *Sol. mscr. in Mus. Brit. A. Cunn. in Hort. Lond. Trans. v.* i. (*new series*) *p.* 521. *t.* 22.—Donia punicea. *G. Don. Syst. of Gard.* ii. *p.* 468.

Kowainguta Kaka, indigenis Anglice *Parrot's-bill.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Shores of Mercury Bay, 1833, Missionaries.

Suffrutex diffusus ramosus, quinquepedalis, ramis viridibus parum lignosis. *Folia* 8-juga cum impari. *Racemi* penduli, multiflori, floribus speciosissimis coccineis. *Legumen* fere tripollices longum, atro-fuscum, venosum. *Semina* reniformia, fusca, atro-nebulosa. *Lindl. loc. cit.*

3. Guilandina, *Juss.*, *L.*

573. *G. Bonduc, L. DC. Prodr.* ii. *p.* 480. *A. Rich. Fl. Nov. Zel. p.* 348.—G. Bonducella, L.—*Forst. Prodr. n.* 185. *Rumph. Amb. t.* 48. and 49.

New Zealand (Middle Island).—1773, *G. Forster.*

4. Carmichaelia, *R.*, *Br.*

Calyx cyathiformis quinquedentatus. *Ovarium* dispermum. *Stigma* simplex. *Legumen* oligospermum (1-3 spermum) replo post lapsum valvularum persistente.

574. *C. australis. R. Br. in Bot. Reg.* 912.—Lotus? arboreus. *Forst. Prodr. n.* 278. *Willd. Sp. Pl.* iii. *p.* 1392. *A. Rich. Fl. Nov. Zel. p.* 345. *DC. Prodr.* ii. *p.* 214.—Bossiæa Scolopendrea. *A. Rich. Fl. Nov. Zel. p.* 345. *non Brownii atque excl. syn. Andrewsii Ventenatisque.*—Genista compressa. *Sol. ms. in Bibl. Banks.*

New Zealand (Northern Island). On the east side.—1769, *Sir Jos. Banks.* Frequent in dry woods and open sandy shores among underwood. —1826, *A. Cunningham.*—(Middle Island). Dusky Bay.—1773, *G. Forster.*

Frutex ramosissimus (sexpedalis) sub statu florescentiæ sæpius aphyllus. Caulis ramique primarii teretes, tenuiores v. plano-compressi v. ancipites, stipulis minutis alternatim dentati. *Folia* e dentibus ramorum fruticis junioris ternata v. pinnata (foliolis 3—7, obcordatis). *Racemi* simplicissimi e denticulis ramorum. *Flores* parvi albo-purpurei. *Petala* longitudine

subæqualia, vexillum lamina latiore quam longiore basi absque callis auriculisve, carina obtusa. *Filamenta* 1—9 fida. *Ovarium* lineare, 5—6-spermum. *Stylus* subalatus. *Stigma* obtusum, imberbe. *Semina* reniformia, sinu clauso, umbilico nudo. *R. Br.*

This very remarkable plant seems to have been but imperfectly understood until Mr. Brown ably defined the true structure of its pod. Forster, with an expression of doubt, referred it to *Lotus*, in which genus it was retained by Willdenow, notwithstanding that he appears to have been acquainted with its fruit; and by DeCandolle in the 2nd vol. of his 'Prodromus,' which appeared in 1825, who could not have been aware of its having been erected into a new genus by Mr. Brown; and from the MSS. of that eminent botanist, published in the 'Bot. Reg.' in September of that year. But the blunders of M. Ach. Richard, respecting this very curious plant which had been living in the English gardens antecedent to the publication of his 'Essai d'une Flore de la Nouv. Zélande' in 1832, (and one might have supposed it would at that time have got into the Paris gardens from us) appear wholly inexplicable. Apparently altogether ignorant of Mr. Brown's name, and evidently without an idea of what Forster meant by *Lotus? arboreus*, he not only inserts this latter in his work from Forster's MSS. at some length, but on finding specimens in fruit of the *Carmichaelia* in the collections formed during the voyage of the Astrolabe by Capt. D'Urville (who had gathered them in the Bay of Islands in 1827), he confounds them with *Bassiæa Scolopendria*, a common Port Jackson plant; and thus our genus appears, in his volume on the Botany of New Zealand, under two names, viz. the above one of *Bassiæa*, and that of *Lotus*.

RHAMNEÆ, *R. Br.*

1. Carpodetus, *Forst. Gen. t.* 17.

575. *C. serratus. Forst. Prodr. n.* 11. *Char. Gen. t.* 17. *DC. Prodr.* ii. *p.* 29. *A. Rich. Fl. Nov. Zel. p.* 366.

Piri-piri-water ab incolis dicitur.

New Zealand (Middle Island).—1773, *G. Forster.* (Northern Island.) On the alluvial banks of rivers, occasionally in salt-water marshes, Wangaroa, &c. bearing fruit in December.—1826, *A. Cunningham.*

Arbuscula 10—20 pedalis, ramosa, ramis foliosis sparsis divaricatisve, foliorum casu tuberculatis. *Folia* alterna, ovalia, oblonga, acuta, petiolata, glanduloso-serrata, superne puberula, subtus discolora, glabra, reticulata. *Racemi* axillares, terminalesve corymbosi. *Calyx* turbinatus ovario adnatus, limbo 5-partito, laciniis linearibus deciduis. *Corolla* 5-petala, petalis albis, æstivatione valvatis, calycis limbo duplo longioribus. *Stamina* 5, filamentis subulatis cum petalis alternantibus. *Stylus* simplex, erectus,

staminibus longior. *Fructus* coriaceus, subglobosus, quasi zona cinctus ex margine calycis adnato, 5-locularis. *Semina* plura, angulata rugulosa.

2. Pennantia, *Forst.*, *Gen.* 67.

Calycis sepala 5, lanceolata, acuta, æstivatione imbricata, in anthesi patentissima. *Stamina* 5, hypogyna, sepalis alterna; filamentis liberis, antheris introrsus bilocularibus, dorso affixis. *Ovarium* sessile, ovato-oblongum, 3 loculare, loculis biovulatis, ovulis ex apice loculi pendulis. *Stigma* sessile, discoideum, obsolete 3-lobum. *Fructus* drupaceus, monospermus, semine inverso. *Endl.*

576. *P. corymbosa*. *Forst. Prodr. n.* 379. *Willd. Sp. Pl.* iv. *p.* 1122. *Endl. Prodr. Fl. Norf. p.* 80. *Rœm. et Sch. Syst. Veg. v.* 5. *p.* 569. *A. Rich. Fl. Nov. Zel. p.* 368. *Icon. Ferd. Bauer, illustr. Pl. Norf. Ins. t.* 165.

New Zealand (Middle Island).—1773, *G. Forster.*

Arbor 40-pedalis, et infra cortice albo. *Rami* teretes, albo-punctati, fistulosi. *Folia* alterna, petiolata, elliptico-oblonga v. obovata, integerrima (vel extra medium serrata) emarginata, venosa, glabra. *Flores* hermaphroditi, pentandri, paucissimis abortu masculis intermixtis, corymbosi. *Corymbi* cymosi, 4-pollicares, in ramis ramulisque terminales. *Ovarium* 3 loculare, loculis biovulatis, ovulis pendulis superpositis. *Drupa* atro-purpurea stigmate coronata, semine unico inverso fœta.

3. Pomaderris, *Labill.*

* *Flores petaliferi.*

577. *P. Kumeraho*, cymis densifloris umbellato-paniculatis, foliis ellipticis coriaceis valde obtusis super glabris subrugulosis margine tenuiter crenulatis integrisve subtus alte costatis ramulisque albo-tomentosis.

Kumeraho nom. vernaculum. *R. Cunningham.*

New Zealand (Northern Island). Banks of the Keri-Keri river, &c., Bay of Islands.—1826, *A. Cunningham.*—1833, *R. Cunningham.*

Obs. Valde affinis *P. ellipticæ* quæ differt foliis præsertim acutioribus, panicula multo minore et laxiore, floribusve perquam minus confertis.

The flowering of this shrub, which takes place in the month of September, the spring of New Zealand, is the signal for the natives to plant their *Koomeras* or sweet potatoes; hence doubtless originates the name by which they call this plant in the present day.

** *Flores apetali.*

578. *P. ericifolia*, foliis linearibus pubescenti-scabris marginibus conduplicato-revolutis subtus cinereo-hirsutissimis, cymis parvifloris axillaribus folio vix longioribus, stipulis subulatis ramisque oblongis. *Hooker, Journ. Bot.* i. *p.* 257.

Tuturnai incolarum.

New Zealand (Northern Island). On hills among fern, Bay of Islands.—1826, *A. Cunningham.*

The above character accords so fully with the plant from New Zealand, as to leave no doubt of its identity with that from Van Diemen's Land, recently described by Sir Wm. J. Hooker in the work above quoted.

Fruticulus incanus, erectus, ramosissimus. *Rami* stricti, numerosi. *Folia* linearia, obtusa, petiolata, 3—4 lineas longa, supra convexa, margine valde revoluta. Flores parvi apetali cymosi, pedunculati, folia subæquantia. Perianthium 5-fidum, laciniis ovatis acutis. Stamina 5, inclusa, segmentis perianthii alterna. Stylus apice trifidus staminum longitudine. Stigmata tria.

Genus novum Rhamneis *affine*, —

Corokia.

Flores dioici. *Mas.* ——. *Fœm. Calycis tubus* ovario adhærens limbo 5-fido persistente, per æstivationem valvato. *Petala* 5, lanceolata, lobis calycis alterna, decidua. *Discus* carnosus, glandulosus, epigynus. *Stylus* 1. *Stigma* capitatum lobatum. *Ovarium* inferum biloculare, loculis 1-ovulatis pendulis. *Drupa* 2-locularis, loculis 1-spermis.

579. *C. Buddleioides.*

Korokia-taranga, appellatio incolarum est. *R. Cunn.*

New Zealand (Northern Island). Margins of woods, on the shores of the Bay of Islands, Wangaroa, &c.—1826, *A. Cunningham.*—1834, *R. Cunningham.*

Caulis fruticosus, 10 pedalis, ramis ramulisque strictis albo-tomentosis instar *Buddleiæ*. *Folia* alterna, lanceolata, acuta, petiolata, coriacea, supra plerumque glabra, valde lucida, subtus dense albo-lanata. *Flores* parvi, subpaniculati, paniculis brevibus sæpius axillaribus v. terminalibus cano-pilosis. *Corollæ* petala alba, oblongo-lanceolata, reflexa, segmentis calycis ter longiora, extus incano-villosa, intus glabra. *Drupa* sphærica, pisi magnitudine (epicarpio fragili, nigro, nitido) apice umbilicato villosa.

Nomen hujus generis ad nomen vernaculum refert.

Genus novum Ordinis manifeste intus
Brexiaceas *et* Celastrineas.

Ixerba.

Calyx inferus, 5-phyllus, persistens, æstivatione imbricata. *Petala* 5, membranacea, unguiculata, disco hypogyno inserta, decidua, fere æstivatione imbricata. *Stamina* 5, hypogyna, petalis alterna. *Antheræ* ovatæ acuminatæ, adnatæ, biloculares, longitudinaliter dehiscentes. *Discus* hypogynus, carnosus, 5-lobatus, lobis inter bases staminum retusis integris. *Stylus* 1, angulatus, continuus, versus apicem attenuatus. *Stigma* simplex. *Ovarium* superum 5-lobum, 5-loculare, loculis 2-ovulatis, ovulis collateralibus suspensis. *Fructus* nondum vidi.

Nomen *Brexiæ* anagramma est, cui generi nostra planta certe maxime affinis.

580. *I. Brexioides.*

New Zealand (Northern Island). A tree on the skirts of woods at Wangaroa, Nov. 1828. *A. Cunningham.*

Arbor elegans sempervirens, viginti pedalis et infra; ramis teretibus glabris, cortice rugoso. *Folia* (1—5 uncialia) alterna, petiolata, exstipulata, ad summitatem ramulorum sæpe verticillato-conferta, elongato-lanceolata, acuminata, obtusiuscula, coriacea remote calloso-serrata, utrinque glabra, superne nitida, subtus pallidiora. *Flores* albi, terminales, corymbosi, pedunculis (uncialibus) plerumque trichotomis.

One of the most remarkable plants of New Zealand, where, however, it is of very rare occurrence, and in affinity approaching nearer to *Brexia* of M. du Petit Thouars than to any other published genus. With it our plant accords in the æstivation and forms of the calyx and petals, in its hypogynous stamens and the figure of the anthers, and in its superior pentagonal quinquelocular ovarium with a disk at its base. In the form of these latter, however, our genus differs essentially; having neither, in the one, an indefinite number of ovules attached in two rows to placentæ in the axis, nor in the other the toothed or fringed lobes between the bases of the stamens, as botanists have described the genus of M. du Petit Thouars. The matured fruit of *Ixerba* has not yet been examined, so that the structure of the seeds remains to be ascertained. Its nearest affinity appears with *Celastrineæ*, with which it agrees in the æstivation of the floral envelopes, the number of the stamens, and their alternating with the petals, but differing in the insertion of the stamens; these, in that family being perigynous, and the ovules, for the most part, ascending from the axis of the ovarium.

[To be continued.]

XXXII.—*Information respecting Botanical Travellers.*

Mr. Gardner's Journeys in Brazil.

The following extracts of letters lately received from Mr. Gardner cannot fail to give pleasure to those who take an interest in his travels and collections, which promise to throw great light on the history of the vegetable productions of a very extensive and hitherto little explored region of tropical South America.—Edit.

Villa do Icó, Sertão of the Province of Seirá,
August 25, 1838.

About the middle of last month I did myself the pleasure of writing to you from Pernambuco, stating that it was my intention to pass into the interior from Aracaty, a sea-port in this province, and probably to try to reach the mountains to the west of the province of

Piauhy, which, from Von Martius' account to Mr. Bentham, must offer a good field for botanical research. I quitted Pernambuco on the 17th of July, in a coasting schooner, for Aracaty. Previous to my departure I was introduced to two gentlemen, brothers, named Pinto, very respectable merchants belonging to Icó, who visit Pernambuco to make purchases about once in two years. The vessel in which I sailed was freighted by them, and I considered myself fortunate in having such companions. Besides ourselves there were about a dozen more passengers; and as the cabin was filled with goods, we were all obliged to sleep on deck without shelter, a most uncomfortable position, as we were four days at sea and it rained heavily nearly all that time. During our meals we more resembled wild beasts than civilized beings, and to crown my misery I was dreadfully sea-sick for two days. An illness succeeded for three days after landing owing to my exposure to the wet.

The town of Aracaty is situated on the east side of the Rio Jaguaride (Ounce river), about three leagues from the sea. The only British merchant there is a young man from Ayrshire, with whom I lived during my stay, and who kindly assisted me in making preparations for the inland journey. Icó is distant from Aracaty about 200 miles, and the intervening country being level, it is customary to convey all goods in large waggons, generally drawn by twelve oxen. In one of these I forwarded all my travelling trunks and bundles of paper, so that I had only to buy two horses, one for myself, the other to carry provisions and a few indispensable articles for the journey. It was about twelve days before the brothers Pinto were ready to depart, and I occupied this time in making excursions around Aracaty, which produced a few species that I had not seen before, among them *Angelonia procumbens* (Martius). The country is uninteresting, especially to a botanist, from its arid and level nature: except one small hill to the south-west and a few sand hills towards the sea, it is a continued plain, covered with abundance of Carnahuba palms (*Corypha cerifera* of Martius), but nothing else worthy the name of a tree. This palm is one of the finest I have seen in the north of Brazil, and I regret that I could not meet with it in flower. Its stem, which is quite straight, rises to a height of about 40 feet, while its fan-shaped leaves are so arranged as to form a sort of round ball at the summit. I have never before seen a palm occurring in such quantities as this does, the road from Aracaty to Icó passing through a dense forest of it, more than 20 leagues in length; its foliage shelters a great multitude of parrots, parakeets, pigeons, woodpeckers, and hosts of other small birds. Of the wax,

which the young leaves produce and which gives origin to the specific name, I have obtained some good specimens for you.

On the morning of the 3rd of August I started for Icó, in company with the MM. Pinto, but by an awkward mistake of my black servant I only travelled with them for one day. On the second morning, setting off before daybreak and in the hurry of departure, the man caught a mare of the same size and colour as my riding horse, and it was 9 o'clock before the mistake was discovered. It was then necessary to halt and send back for my beast, a distance of 3 leagues; but I was not sorry for this, as the Pintos travelled at full speed, thus preventing me from gathering several plants which I saw by the wayside. They accomplished the distance in five days and a half, and I in eight. I however travelled more at ease, and made a small collection of plants. At this season the road is as good as the common roads in England. For the first two-thirds of the way the ground is level, but the latter part is more undulating and rocky, in consequence of being traversed by several small sierras. Nearer Aracaty the vegetation consists chiefly of Carnahuba palms, mixed occasionally with small trees, such as *Patagonula americana*, Linn., called *Pao-branco*, from its large clusters of white flowers, a species of *Zizyphus*, several *Mimosas*, and a small tree to which the natives give the name of *Pereira*. The latter I did not see in flower, but it has a superior fruit, formed of two woody valves, dehiscent from top to bottom, one-celled, many-seeded, the seeds broadly winged and suspended from the summit of the valves. The fruit is of an obovate form, nearly 3 inches long and $1\frac{1}{2}$ inch broad. The country further up, which as I before remarked is more undulating, consists of large open places (*vargems*) almost destitute of vegetation, extensive tracts being, however, covered with small trees and shrubs (*Catingas*), all of which are deciduous, the heat and drought producing the same effect on foliage here as the cold does in the north of Europe.

On my arrival at Icó I found that my friends the Pintos had prepared an empty dwelling belonging to them for my reception. In consequence of the non-arrival of my trunks, which were delayed by the breaking down of the waggon which conveyed them, I was however detained here, as they only came three days ago. The town of Icó is of considerable size, containing about 7000 inhabitants, and situated in a plain, from which all vegetation has already disappeared, though it is not long since the rains have ceased. Of course there is little for me to do here, but I am assured by everyone that the case is quite otherwise at Crato, about 100 miles higher up the country, a town situated at the foot of the mountains which divide this province

(of Leira) from that of Piauhy, and where there is verdure all the year round. Should these accounts prove correct I will stay there a short time to botanize, if otherwise I shall push on immediately to Oceiras, picking up all I can by the way. The first rains (primeiras aguas) fall in Piauhy in October, and I shall try if possible to reach Oceiras before the end of that month, and remain there till the rains are over, so as to be ready to start immediately for the westward. Should all proceed according to my wishes, I hope to spend some months in Piauhy, and then proceed to the Rio Tocintins, descending this river to Pará. I have met with several persons who have been to Oceiras and beyond it, and especially an old man, who tells me that he has made the journey twenty-eight times. All represent the country as well-watered and fertile, but they add that fevers of a malignant and intermittent character prevail there, which are peculiarly fatal to strangers from other provinces. Such reports will not however prevent my undertaking the journey; my only fear being lest my collections should not cover the expense, which threatens to be considerable, though my constant endeavour is to spend as little as possible. My four horses have cost about 40*l.*, and it is very probable that when I start for Crato I may require another. My servant, an active and useful fellow, costs about 2*l.* 10*s.* a month, and it is often needful to have the assistance of another person, who may lend occasional help and act as a guide. While travelling, I always start at day-break, and about 10 o'clock, when the sun begins to get hot, I rest at some place where grass and water can be obtained for the beasts, and remain stationary till about 3, when I set out again, and continue proceeding till 6 or 7. When a house can be seen in the neighbourhood I take advantage of the shelter of its verandah, otherwise my hammock is slung under a tree. Nothing can be simpler than my diet; a basin of tea and two biscuits for breakfast, dried beef and farinha of mandiocea for dinner, varied sometimes by a stew of such parrots or pigeons as I can shoot, and my supper at night is of the same fare as my breakfast. Wine or spirits I never taste, having found by experience that they are rather injurious than otherwise when travelling. During the middle of the day, while the horses are resting, I shift and arrange my plants, and generally walk a little way to add something to my collections.

The following is a list of a few of those plants which I gathered between Aracaty and this place:—*Angelonia procumbens*, Martius; and another large and beautiful species of this genus, which I believe to be new; *Patagonula americana*, in fruit and flower; a very fine *Herpestes*, and a beautiful *Evolvulus*, growing about a foot high, very much re-

sembling *Linum usitatissimum* in the arrangement, size and colour of its blossoms; *Pithecoseris pacourinoides* (of Martius in DC. Prodr. v. 5.); an undescribed species of Martius' new genus *Stilpnopappa* (DC. Prodr. v. 5.); *Triplaris mexicana*, with both male and female flowers; two fine *Polygalæ*; a large yellow-flowered *Utricularia*; a *Villarsia*, with white inflorescence; and a *Combretum*, perhaps *C. micropetalum*, DC.; besides a number of other things, of which I am sorry not to have got complete sets, owing to the small quantity of paper that I took, not anticipating the leisurely manner in which I performed the journey between Aracaty and this place. I gathered the other day, in this neighbourhood, a species of *Hyptis*, that appears to me an anomaly in the tribe to which it belongs. So far as I am aware, all the *Labiatæ* have square stems, but the stem and branches of this one are quite round. It appears to be abundant here; the heat and drought, however, have so destroyed all vegetation, that I could only procure two wretched specimens, with a few flowers on them. The blossoms are large and light blue. I however gathered a few of its seeds.

As respects *Cacteæ*, I have seen nothing different from what I sent from the Rio San Francisco, but if I find any between this place and Oceiras I shall endeavour at least to obtain seeds of them; while if this tribe inhabits the vicinity of the Tocantius it will be easy so to transport the living specimens to Pará. It is of course out of the question to expect *Orchideæ* in such a country as this. The province of Pará may perhaps afford some, and their seeds at least I shall secure, for they are easily conveyed from place to place.

On quitting Pernambuco, I requested Mr. Harrison's house to forward nothing after me, neither letter nor parcel; thus for a long time to come I shall be deprived of all intelligence of my friends in England. The hope that good tidings will await my return to Pernambuco must cheer me during my wanderings. If I have not the pleasure of addressing you again from Crato I will certainly do so from Oceiras, and give you a full detail of my past and present proceedings.

It is confidently stated that within a few months large steam-boats will have arrived from Britain, which will ply constantly between Pernambuco and Rio de Janeiro, and in one of these I can easily return to the former place, and thence to Rio on my way to Monte Video. I only hope that health and strength will be granted to me to accomplish the journey to Pará, and then I shall think nothing of the dangers, toils and difficulties that I must expect to encounter.

Not a single beetle have I seen since quitting Pernambuco; the country is too arid and barren for them.

I much regret that the few instruments which I wrote about some months ago did not arrive before I left Pernambuco, especially the *Sympiesometer*. It is always useful and interesting to ascertain the height of mountains in little-known localities, and I hope to find them on my return to that country. The thermometer here, at this time, never stands under 86°, and often so high as 93° at noon, but during the night it falls about 10°, so that the mornings and evenings are delightfully cool.

There is a little, and but a very little, cotton cultivated between this place and Aracaty; most of the country people being engaged in rearing cattle. The cotton is more grown further up, along the base of the mountains.

[A subsequent letter from Mr. Gardner will be given in our next Number.—Edit.

BIBLIOGRAPHICAL NOTICES.

Synopsis Floræ Helveticæ; Auctore J. Gaudin; Opus posthumum continuatum et editum a J. P. Monnard, Turici, 1836. 24mo.

The 'Flora Helvetica' of Gaudin, which extends to seven octavo volumes, is too well known and appreciated to require any praise from us, but we believe that this little work has not attracted any attention in Britain. It stands in the same relation to the 'Fl. Helv.' that Smith's 'Compendium' does to his 'Flora,' except that it enters more into detail. Generic and specific descriptions of 2313 Swiss flowering plants are given, and generally a few observations in addition: the arrangement is Linnæan, and we can strongly recommend the book to botanists intending to visit Switzerland or requiring short descriptions of the plants of that country.

Flora Cestrica; or an Attempt to enumerate and describe the Flowering and Filicoid Plants of Chester County, in the State of Pennsylvania; with brief Notices of their Properties and Uses in Medicine, Domestic and Rural Œconomy, and the Arts. By William Darlington, M.D., &c.

Botany is indeed making rapid progress in the United States. Practical and experienced botanists are now resident in the Northern, the Middle, and Southern States, busily engaged in investigating the riches of the vegetable kingdom in their respective districts, and communicating to each other and to foreigners the well-dried spe-

cimens, the result of their discoveries. The name of Dr. Darlington has been long known as the author of a little work under the unassuming title of 'Florula Cestrica,' or an Essay towards a Catalogue of the Phænogamous Plants of West Chester (1826); containing many valuable and original observations, which have in the present work been greatly extended. Accompanying every species in the 'Flora' there is a full description and remarks, an excellent glossary, and a very neat map of the county, coloured so as to indicate the geological structure; all, in short, that a botanist can wish who is studying the plants of that inland district. The arrangement in the body of the work is the Linnæan, and the author remarks, that "whilst he freely admits that the true science of vegetables can only be attained by a well-disciplined and philosophical investigation of their structure, functions, and natural affinities, he cannot help thinking, that even the superficial knowledge of genera and species, which is so readily acquired by the Linnæan system, may be advantageous to the cause, by exciting an early interest in learners, and facilitating the first steps of the uninitiated. When the young recruits are once securely enlisted, we may venture to exact a more rigid discipline."

An appendix contains a list of the genera and the number of species comprised in the work, arranged according to the natural affinities; from which it appears, that there are (exclusive of *Cellulares*) 128 orders, 482 genera, and 1073 species in West Chester County. But of these there are

Cultivated	92	
Introduced and naturalized, about..	138	——230
Indigenous		843
Total		1073

Novitiarum Floræ Suecicæ Mantissa prima. E. Fries, Lundæ, 1832. 8vo.

We have only recently obtained a copy of this pamphlet, which we consider well worthy of its excellent author; but although it has been now published for some years, it is scarcely, if at all, known in this country. In it he has followed up the plan which he had adopted in the two editions of his 'Novitiæ;' taking as his text the 'Flora Suecica' of Wahlenberg, he has written a commentary upon it introducing as he proceeded numerous recent discoveries. The first and shorter part of the present publication is chiefly occupied by the description of plants newly added to the Swedish Flora, and the

second division (from page 21 to p. 80.) is entitled 'Commentatio de Salicibus Sueciæ.'

Under *Scirpus multicaulis*, Sm., is given a very detailed account of the mode of growth and structure of that plant and of *Sc. palustris*, *pauciflorus*, and *cæspitosus*. A new species of *Cuscuta*, considered as intermediate between *C. europæa* and *epilinon*, which has been discovered by Mr. Blyth of Christiania, parasitical upon *Chenopodiaceæ* on the sea-shore of Norway, is described under the name of "*C. halophyta*, caule simplici, florum glomerulis multifloris subbracteatis, corollæ tubo globoso limbum æquante." We have seen specimens of this plant from Norway in the Herbarium of Mr. R. B. Bowman of Newcastle, and it is much to be wished, that that gentleman, or some other botanist, who may have the opportunity, would examine the structure of the scales in the interior of the corolla, as no notice is taken of that part by Fries.

Zannichellia pedunculata and *polycarpa* are separated from *Z. palustris*: the former we suspect is only a variety, but the latter appears to be a good species, characterized by its very short styles.

In the 'Commentatio de Salicibus' our author first endeavours to determine the species contained in 'Linn. Fl. Lapp.' and then proceeds to enumerate and describe all the Swedish species; and the synonyms of Linnæus, Smith, Willdenow, Wahlenberg, and Koch are quoted throughout. It would occupy too much of our space to go in detail through this part of the book before us, nor indeed is it at all necessary, as we doubt not that it will soon be in the hands of all students of this very difficult genus.

A new number of Reichenbach's 'Icones Floræ Germanicæ' has just reached us: it contains 23 plates, figuring 56 species and varieties of German Violets. The plates are executed with the usual care, and will be found most useful in determining the different forms in this genus.

PROCEEDINGS OF LEARNED SOCIETIES.

LINNÆAN SOCIETY.

March 5, 1839.—Edward Forster, Esq., V.P., in the Chair.

Read, "Observations on some Fungi or Agarici, which by deliquescence form an inky fluid, drying into a bister-coloured mass, capable of being used as a water-colour for drawings, and of a very indestructible nature by means of common agencies." By John

Redman Coxe, M.D., formerly Professor of Materia Medica in the University of Pennsylvania. Communicated by the Secretary.

Dr. Coxe having gathered a Fungus and placed it on a sheet of white paper, leaving it until the next day, found several drops of an inky fluid, slowly trickling from the inner surface, which had assumed a black appearance; by placing the Fungus in a glass, the whole except the outer skin liquefied. The colour of the fluid was rather a deep bister than black, and being left in the glass, in a few hours it separated into a solid sediment, with a lighter coloured fluid swimming above. Having afterwards collected a considerable quantity of fluid from the same species, he obtained by drying an extract of a pretty deep black colour of both parts conjoined, which would otherwise have separated. This on trial formed an admirable bister-like water-colour, well adapted for drawing when mixed with a little gum.

Dr. Coxe used the "fresh inky fluid as ink, and from such fresh fluid the accompanying drawings were made;" but it was soon found that its change was too rapid to think of depending on it for such a purpose, he therefore was led to dry it as quickly as possible by spontaneous evaporation, and then to use it diluted with water. Having exposed various portions of writing thus made to the direct rays of the sun for several months with little change, he tried the effects of chlorine and euchlorine gas, muriatic acid, and ammoniacal gases: from these but a trifling change ensued, except from the muriatic acid gas, which destroyed very considerably the dark tint of the writings. He also placed some small and recent specimens of the Fungus in a solution of corrosive sublimate, which preserved them and prevented any deliquescence: the same effect was produced by alcohol.

The ink is fully formed and escapes in about three or four days. When received into a phial, in a short time the heavier and blacker matter was found to settle as a sediment; the lighter brownish amber-coloured fluid surmounts it, and may be poured off from it to dry them separately. From a good-sized specimen nearly half an ounce of fluid has been obtained.

The following chemical experiments among others were made:—

1. Two drachms of the fluid added to ℥ 1 of hydrate gave a clear brown transparent solution, to which in separate glasses was added

2. *Nitrate of Silver*: no effect at first, but in a few minutes dark brown flocculi subsided, leaving a transparent fluid above.

3. *Muriate of Barytes*: no effect at first, finally a subsidence of dark brown flocculi.

4. *Acetate of Lead.* Immediate dark brown flocculi, leaving a clear liquid above.

5. *Carbonate of Potash.* Transparency destroyed; a trifling brown deposit in a few hours.

6. *Alcohol.* No apparent change from it.

7. *Solution of Corrosive Sublimate.* An apparent diffusion of brownish hue, gradually subsiding in dirty brown flocculi.

8. *Dilute Muriatic Acid.* The same, but much smaller in amount.

10. *Lime Water.* Light brown flocculi in a few hours.

11. *Liquor Ammoniæ.* No effect.

12. *Succinate of Ammonia.* Deep brown deposit in a few hours.

13. *Prussiate of Potash.* No effect.

14. *Oxalate of Ammonia.* Clouds form and settle in a dirty brown sediment.

From these experiments Dr. Coxe is disposed to think that an excellent *India Ink* might be prepared for drawing; perhaps its dried deposit mixed with oil might answer for engravings; and as an ink, indestructible from any common agents, it might be well to try it in the filling up of bank notes and other papers of consequence, as he believes it cannot be extracted by any means without destroying the paper itself.

The Fungus described, and on which the above experiments were tried, is referred with some hesitation to *Agaricus ovatus*, Schæffer, 'Icones Fungorum,' fig. 7. *A. cylindricus*, fig. 8. *A. porcellaneus*, fig. 46. and 47. The drawings are named *Agaricus ovatus**.

March 19.—Edward Forster, Esq., V. P., in the Chair.

Read, "A Notice of the Birds of Iceland, accompanied by specimens." By George Townshend Fox, Esq., F.L.S.

It is perhaps not generally known that the Durham University has established a Museum as one of the necessary appendages of an academical institution; the subcurator of which, Mr. Wm. Proctor, requested and obtained permission to go out to Iceland in the summer of 1837 to procure a collection of the birds of that island. Three months were passed on the most northern part of Iceland, this locality being chosen by Mr. Proctor as one least visited by naturalists,

* The drawings evidently represent *Agaricus fimetarius*, Linn. and Curtis; *A. comatus*, Mull. and Berkeley; *A. cylindricus*, Sowerby; to which *A. cylindricus*, Schæff. f. 8. and *A. porcellaneus*, figs. 46 & 47. belong; it is not so clear that *A. ovatus*, fig. 7. (the name adopted by Dr. Coxe) does. In the subgenus named by Berkeley Coprinus every species is deliquescent. Curtis observes, under his *A. ovatus*, which is *A. atramentarius*, Bull. and Berk., that the seeds may be seen in the black liquor if magnified.

and therefore the most likely to repay his labours by the number or rarity of the specimens to be obtained. Skins of fifty-two species of birds were brought home, besides skins of six Rein Deer, three species of Seals, two large Fishes (*Anarrhicas*), and a Porpoise.

Frederick Faber in his Ornithology of Iceland, published at Copenhagen in 1822, enumerates eighty-four species of birds; of which about twenty are land birds, and sixty water birds. Faber adopted the nomenclature of Linnæus, but an examination of the skins brought home by Mr. Proctor has led to the belief that several of Faber's birds are not identical with the Linnean species. The Iceland Falcon is considered by Mr. Hancock* as distinct from the whiter falcon of Greenland. The Iceland Grouse is correctly considered by Faber as peculiar to that island. The Bridled Guillemot, *Uria lacrymans*, Lapyl., is for various reasons believed to be a species distinct from the Common Guillemot, *Uria Troile*, Lath. *Clangula Barrovii* was found breeding on the ground in a nest formed of its own down, and placed among aquatic plants a little above high-water mark. Some rare eggs were also obtained, namely, those of the Iceland Falcon, Little Auk, Bridled Guillemot, and Sclavonian Grebe.

Read also a paper, "On the Structure and Development of the Reproductive organs of *Pilularia globulifera*." In a letter to R. H. Solly, Esq., F.R.S. and L.S. By William Valentine, Esq., F.L.S.

The author observes, that the involucrum of *Pilularia globulifera* contains two kinds of bodies, which, however, occupy distinct sacs; one kind are round, very numerous, and minute, not larger than the 460th part of an inch; they are found principally in the upper part of the involucrum, and are about forty in each sac. The other kind are of an oblong pyriform shape, a little constricted near the middle, with a conical projection at one extremity, and are much less numerous, about sixty, and occur singly in each sac; they are about the 80th part of an inch broad, and have the power of germination, which the former kind do not appear to possess. Both kinds are loose in their sacs, and have an opake, pure white, minutely granular, testaceous covering, and are imbedded in a kind of gelatin, which softens and expands by the action of water, but is not completely dissolved. The larger bodies, the undoubted sporules, after a very slight maceration in water, (less than a minute is sufficient,) are en-

* See Mr. Hancock's paper on this subject in the 'Annals of Natural History,' vol. ii. p. 241.

veloped by a well-defined covering of gelatinous matter, which before the maceration existed in a concrete state. Further maceration does not appear to affect this gelatinous covering, as it remains unchanged long after germination, and gives to the sporule the appearance of having a very delicate transparent border, whose breadth is about the 4th part of the diameter of the sporule.

The sporule consists of three coats, the outer of which is white, opake, somewhat brittle, more or less incomplete at the conical extremity, but much thickened about the upper third of the sporule, where it exhibits traces of cellularity. The middle coat is membranous, elastic, of a light yellowish brown colour, and perforated at the apex of the conical projection which is essentially formed by this coat, the outer coat being gradually lost upon its surface, or in some instances being scarcely continued on to it, in which case the sporule appears truncated, the middle membrane not having sufficient firmness of itself to support the conical form. This conical projection is more or less plicated, and in those instances in which the outer coat is very deficient the middle membrane exhibits lines radiating from the aperture. The third coat, or internal membrane, is similar in colour to the middle, differing from it however in being inelastic, and not being continued into the cone, but forming a short cavity, by passing directly across the base of the cone, at which point it is not in contact with either of the other membranes, and is marked by three lines, which radiate from the centre of the unsupported portion, and indicate a valvular structure to allow of the protrusion of the growing matter in germination. The cavity of the sporule is occupied by a quantity of grumous fluid and particles, which are of various sizes, the larger ones being mostly of an ovoid shape, but altering by pressure.

I found many of these sporules in a germinating state, the majority having escaped from the involucrum, but in several instances I found them considerably advanced in germination before the rupture of the involucrum and whilst they were yet inclosed in their sacs. The first external sign of germination is either the appearance of four cells projecting through the apex of the conical projection or a general swelling of that part. By dissection, however, we can observe this process at an earlier period, and I find upon removing the conical projection that the first evidence of germination having commenced is an appearance of cellularity within the unsupported or valved portion of the internal membrane, which is transparent; and I now find for the first time a very delicate pellucid membrane lining the whole cavity of the sporule, and having the cells

which give the appearance just mentioned either lying on its external surface or forming that portion of it which lies beneath the valves. From the appearances and impossibility of separating the cells from the membrane I am inclined to believe that the cavity formed by this membrane is completed by the cells, or, in other words, that the sac is partly membranous and partly cellular. It is possible that this last described membrane may exist before germination begins, notwithstanding the numerous unsuccessful dissections which I have made to discover it, the failure being owing to its extreme delicacy; but I am pretty well satisfied that it is a product of germination, because I have not the slightest difficulty in demonstrating it after that has commenced, nor is there the slightest trace of it in any stage of the development of the sporule. However this may be, it is quite certain that fresh cells are gradually formed on the external surface of the cellular part of the sac, and that the valves of the third membrane are very soon ruptured and gradually turned back by the growth and protrusion of this button-like cellular germ. The enlarging cellular mass then distends the conical projection, unfolding the plicæ of that body, and at length appears externally, with four of its cells projecting beyond the general mass and compressed into a quadrangular form, I fancy by the pressure of the apex of the cone, the aperture in which is quadrangular. These projecting cells soon harden and acquire a reddish brown hue, and in the advanced stage of germination appear like a brown quadrangular space, which I should have little hesitation in referring to the above cause did I not find several similar spaces on the germinating sporules of *Isoetes lacustris*, which I could not refer to such an origin: it must be observed however that I have not seen the earlier stages of germination in *Isoetes*. Soon after the exposure of the entire germ, which is effected by the reflexion of the valves and conical membrane over the side of the sporule, where they lie quite concealed by the germ, little fibrillæ or rootlets begin to shoot from one side. They are simply articulated tubes or elongated cells applied end to end with frequently a bulbous extremity, and each is produced from one of the cells of the germ. They differ much in length in different sporules; in some they are not longer than the sporule, whilst in others they are three or four times that length, and, in common with the cells of the germ, contain granules which in these are colourless but in the germ green. The cluster-like appearance of the cells which form the germ, soon after the appearance of these fibrillæ begin to change, the cells becoming flatter and more intimately connected with each other. At the same time an internal change is taking

place, for by a gradual arching or receding upwards of that part of the germ which closes the cavity of the sporule the germ becomes hollow, the hollow communicating with the cavity of the sporule, which is of course proportionably enlarged. The germ now gradually points in two places, which are by no means fixed, but occur in various situations according to the position of the sporule in relation to the light. The direction of the first leaf is generally in the direction of the axis of the sporule, or rather a little inclined, and that of the first root at right angles or lateral, but very soon changing to an opposite direction to that of the leaf. This would be the constant direction if the sporules were always left to themselves free from entanglements, on account of the peculiar structure of their outer coats; the spongy fibro-cellular texture of the superior third of which, causing that end to be the most buoyant in the water, exposes the superior surface of the germ to the direct action of the light; but as it cannot always happen that the sporules should be free, the direction of the leaf and root is sometimes quite the reverse, and at others both leaf and root are lateral, but proceeding from opposite sides of the germ. These two points gradually lengthen, and if dissected each will be found to consist of a closed sheath, containing in one instance the leaf, in the other the root in the form of a conical process like a finger in a glove. The young leaf, which is taper and its cells crowded with green granules, being in advance of the root, which is obtuse and destitute of green granules, bursts through the summit of its sheath when it has become rather longer than the sporule, whilst the root, although more backward in its development, pierces its sheath before it is as long as the sporule. The sheaths are not distinct, but communicate with each other; and the only point of connexion between the sheath (there being in fact but one) and the germ is around its base close to the sporule, so that nearly the whole of the germ is inclosed in this sheath. Besides this sheath which embraces the upper part of the root, there is an exceedingly delicate expansion, which so closely embraces the extremity of the root like a cap, that it is only by a careful examination that it can be discovered. I am not aware that this has ever had any connexion with the sheath through which the root bursts, but, on the contrary, I believe it to be a distinct formation. After the leaf has grown many times the length of the sporule, or about 2 lines long, another leaf grows from the germ close to the first, to which it is in all respects similar, and then a bud begins to be developed from some indefinite part of the germ, but like the leaves and root from within the sheath, which is now frequently much lace-

rated. This bud is covered by a peculiar kind of jointed hairs, whose attachments are lateral, at a short distance from their bases, and they contain a few colourless granules. This bud sometimes appears after the first leaf, in which case there is no second primordial leaf formed, and is the rudimentary stem, the first growth from it being a leaf which exhibits, although in a small degree, the first evidence of gyration, and shortly after a root which is furnished with its own sheath. As I have not seen more advanced specimens, I am unable to describe the succeeding steps; but as, up to this point, my observations were made upon several hundred examples, I may safely affirm that the instances were sufficiently numerous for my purpose.

All the leaves after the primordial ones, or those which grow direct from the germ, are developed in a similar manner to ferns, and even the running stem partakes in a slight degree of the same gyrate evolution. The roots are all formed in sheaths, through the apices of which they ultimately burst; the sheath continuing to embrace the base of the root, whilst a distinct and far more delicate sheath closely embraces its point. Transverse sections of the stem, root, and leaves show them all to be hollow with the cavity divided longitudinally into separate channels. In the stem these longitudinal partitions are about fifteen or sixteen in number, and in the leaf and root they are about ten or twelve, which in the latter are arranged in pairs. These partitions radiate from a central column of enlarged cells which surround a bundle of minutely dotted ducts that may be unrolled spirally, and the channels between these partitions are frequently divided by transverse partitions or diaphragms. The cells which form these partitions are curiously arranged—they are flattened on two opposite sides, and connected with each other by their narrow sides and extremities, but only at intervals, so that there are numerous holes formed which afford a free communication between all the channels. In the partitions of the root the intervening holes are so large in proportion to the breadth of the cells that these have the appearance of a string of beads. Another peculiarity of the root is, that, in addition to the diaphragms formed of this tissue, which are also found in the stem and leaf, a peculiar body is frequently met with occupying a similar position to the diaphragms. These bodies (for they are sometimes numerous) are each formed of one or more cylindrical cells coiled up in a gyrate manner. They grow from the angle formed by the partition and the cuticle, and are developed subsequent to the other tissue, for they may be found in various stages of advancement in the same root. Their nature I have not been able to ascertain.

The author then proceeds to describe the development of the sporules. A transverse section of the involucrum when about the size of a small pin's head shows it to consist of four integuments, containing a mass of very delicate spongy compressible cellular tissue, subdivided into four equal triangular portions by four lines radiating from the centre. In the centre of each of these portions is a cavity, and projecting into each of these cavities are a number of nipple-like processes which are attached in each cavity to a common receptacle, whilst this again is connected with an open rigid cellular tissue that lies between the spongy tissue before described and the involucrum, and serves as a connexion between the two. As the involucrum advances, the spongy tissue recedes all round the four cavities, which consequently become larger and afford more space for the growth of the nipple-like processes. This recession of the spongy tissue is not caused by the pressure of the growing processes, for it is frequently in advance of them; but it is produced by a gradual condensation inherent to the tissue around the cavities and along the radiating dividing lines, which, in fact, are nothing more than this condensation, which at maturity is so complete that the whole of the spongy tissue is condensed into four dissepiments, dividing the cavity of the involucrum into four equal loculi. The nipple-like processes are found upon a careful examination to be hollow sacs with obscurely cellular walls—those which occupy the lowest part of the involucrum being considerably in advance of the upper ones. These sacs contain a quantity of grumous matter, and a number, perhaps about ten, of soft rather opake pulpy bodies, which are evidently compounded of four closely connected parts so placed on each other as to form a cone with a triangular base.

April 2.—The Lord Bishop of Norwich, President, in the Chair.

Mr. Owen read a Paper on a New Species of the genus *Lepidosiren* of Fitzinger and Natterer. The author commenced by adverting to the first announcement of that anomalous animal, the *Lepidosiren paradoxa*, as the type of a new genus of Perennibranchiate Reptiles by Fitzinger at the meeting of the German naturalists at Prague in 1837, and to its subsequent description by its discoverer Dr. Natterer, the well-known South American traveller.

With the generic characters assigned by these able German naturalists to their *Lepidosiren*, the species described by Mr. Owen fully and closely agreed; but it differed specifically in the greater relative length of the head and rudimental extremities, and its much smaller size.

Mr. Owen observed, that since the time of the discovery of the *Ornithorhynchus* there had not been submitted to naturalists a species which proved more strongly the necessity of a knowledge of its whole organization, both external and internal, in order to arrive at a correct view of its real nature and affinities, than did the *Lepidosiren*, and as he had felt a reluctance to bring before the Society an incomplete description, which might only have served to raise new doubts in the minds of naturalists with regard to this animal, he had deferred since June 1837 the completion and communication of the present paper. He had however at that time prepared a brief description of the specific characters of the specimen in question, under the name of *Protopterus*, and had referred it in the Catalogue of the Museum of the College of Surgeons to the Class of Fishes, on account of its scaly covering and the condition of its nostrils as plicated sacs, and to the abdominal family of the Malacopterygian order of that class, in which it seemed to present an extreme modification or rudimental condition of the fins indicative of a transition from the abdominal to the apodal families.

The anatomical details which formed the principal part of the present communication, confirmed the propriety of referring the *Lepidosiren* to the class of fishes; but they also led, Mr. Owen observed, to a considerable extension in his original views of its affinities in that class.

A minute description was then given of the external characters and peculiarities of the present species, which differed from the *Lepidosiren paradoxa* in the greater relative length of the head and rudimental fins as compared with that of the trunk; and in its general size, which is three-fourths smaller.

The chief peculiarities of the *skeleton* consist in its imperfect, or rather partial ossification, and in the green colour of the ossified parts; in which it resembles that of the gar-pike (*Belone vulgaris*). The parts which continue permanently in the cartilaginous condition are the petrous elements of the temporal bones containing the acoustic labyrinth, a portion of the articular pedicle of the lower jaw, the branchial arches, and the bodies of the vertebræ: these, moreover, are not separated to correspond with the neurapophyses and ribs, as in Plagiostomous Cartilaginous Fishes, but retain their primitive confluent condition as a round continuous chord, extending from the occiput to the end of the tail: this vertebral chord consists of an external firm, elastic, yellowish capsule, enveloping a softer subgelatinous material, as in the Cyclostomous Fishes. The corresponding parts or basilar elements of the cranial vertebræ were ossified: and Mr. Owen then entered upon a detailed description of the skull.

The ribs are thirty-six pairs, and consist of short, slightly curved, slender styles, encompassing, with the spine, about one-sixth part of the cavity of the abdomen. These ribs are attached to the lower part of the side of the fibrous sheath of the central vertebral chord; their pointed free extremities are cemented to the intermuscular ligaments.

The superior spines are throughout separated from the neurapophyses, and these are not anchylosed together at their upper extremities. Hæmapophyseal spines are developed in the caudal region, and both these and the neurapophyseal spines have articulated to them dermo-osseous spines, of equal length, with their distal extremities expanded, and supporting the transparent elastic horny rays of the caudal fin. The rudimental filiform pectoral and ventral fins were supported each by a single cartilaginous ray composed of many joints.

The muscles of the head, jaws, hyoid and branchial apparatus were then described: the muscular system of the body consists of subvertical layers of oblique fibres separated at brief intervals by aponeurotic intersections.

The following peculiarities of the *Digestive system* were then pointed out;—two long, slightly curved, slender, sharp-pointed teeth project from the intermaxillary bones, which are moveable. The upper maxillary bones support each a single dental plate divided into three cutting lobes, by two oblique notches entering from the outer side: the lower jaw is armed with a single dental plate similarly modified, the produced cutting edges fitting into the notches above: these maxillary teeth somewhat resemble the dental plate of the extinct *Ceratodus* of Agassiz. The fleshy and sensitive parts of the tongue are more developed than in fishes generally. The jaws are adapted to minutely divide and comminute alimentary substances; the pharyngeal opening is contracted; the entrance to the pharynx guarded by a soft semicircular valvular process. Gullet short, straight, narrow, but longitudinally plicated. Stomach simple, straight, with thick walls, in capacity corresponding with the œsophagus; terminating by a valvular pylorus projecting with a scalloped margin into the intestine. No pancreas or spleen. Liver well-developed, partly divided into two lobes. A gall-bladder, and large ductus choledochus, opening by a valvular termination close to the pylorus. Intestine round, straight, at first of equal diameter with the stomach, but gradually contracting to the vent, with thick parietes; traversed internally by a spiral valve describing six gyrations; the first of which is the longest.

The *respiratory organs* consist of branchiæ, and a double elon-

gated air-bladder, with the usual vascular and cellular structure of the lungs of a reptile.

The *branchiæ* consist of elongated, sub-compressed, soft, pendulous filaments, attached to cartilaginous branchial arches; these arches are not joined together, or to the os hyoides by an intermediate chain of cartilages or bones below, nor are they articulated to the cranium above. There are six branchial arches on each side, and five intervals for the passage of the water from the mouth to the branchial sac. All the branchial arches do not support branchial filaments; but only the first, fourth, fifth, and sixth. The first and last branchial arches each support a single row, the fourth and fifth each a double row of branchial filaments. The second and third branchial arches have their full proportions, but offer not the slightest trace of gills. The branchial sac is pretty large, and opens externally by a small vertical fissure immediately anterior to the rudimental pectoral extremities.

The *heart* is situate below the œsophagus, in a strong pericardium; it consists of a single auricle and ventricle and a contorted bulbus arteriosus, with a longitudinal valvular process as in the *Siren*. The two branchial arteries, which wind round the gill-less arches, afterwards unite together on each side, and give off branches which form the pulmonary arteries, or those which go to the air-bladders.

The apparatus for aerial respiration commences by a short, single, wide and membranous trachea, or *ductus pneumaticus*, which commences by a longitudinal laryngeal slit, one line in extent, situated three lines behind the orifice of the pharynx: a single plate of cartilage is continued from this laryngeal opening forwards to that of the pharynx: the plate is as broad as the floor of the pharynx, and its office seems to be to prevent the collapse of the parietes of that tube, and to keep a free passage for the air to the trachea. This tube dilates at its lower end into a sac with very thin parietes, which communicates directly with each division or lobe of the air-bladder. These lobes or *lungs* are partially subdivided into small lobes at their anterior and broadest part; and then continue simple and flattened, gradually diminishing to an obtuse point situated behind the posterior extremity of the cloaca. The whole of the parietes of the lungs is honey-combed: the cells are largest, deepest and most vascular and subdivided at the anterior and broader end of the lung. The lungs are situated behind the ovaria, the kidneys, and the peritoneum, which is in contact with merely that part of their ventral flattened surfaces, not covered by other viscera.

The two *kidneys* are quite distinct, very long and narrow, but

broadest towards the cloaca: the ureters communicate with the back part of the common termination of the oviducts. There were not any suprarenal bodies, nor any spleen.

The *ovaria* are two long, flattened bodies, with ovisacs and ova of different sizes: many between 2 and 3 lines in diameter, scattered among clusters of other ova of smaller size. The *oviducts* are distinct tortuous tubes, which commence by a very wide and thin-coated portion, opening by a slit, 3 lines wide at their anterior extremity, and not communicating with each other before opening into the peritoneal cavity, as in the Plagiostomes. The oviduct contracts and performs many short undulations, adhering to the ovarian capsule as it descends: its coats become thicker, and oblique spiral folds are developed from the inner surface; the capacity of the oviduct increases before its termination, which is by a single prominent opening, common to the two oviducts in the posterior part of the cloaca.

A small *Allantois* is situated between the oviduct and rectum. The cloaca receives the above parts in the following order,—first, or most anteriorly, the common opening of the peritoneal canals; secondly, the anus; thirdly, the Allantoid bladder; fourthly, the oviducts, with the ureters, which open into the back part of the oviducts.

The *brain* consists of two elongated subcompressed distinct cerebral hemispheres; a single elliptical optic lobe, or representative of the bigeminal bodies; a simple transverse cerebellar fold, not covering the widely-open fourth ventricle; largely developed pineal and pituitary glands; and a single corpus mammillare.

The *nerves* given off from the brain, were the olfactory; the optic, which arose from the same point at the middle line between the crura cerebri, and did not decussate; the fifth pair; the acoustic; the pneumogastric; and lingual nerves: there were no traces of the third, fourth, or sixth nerves; there being no muscles to the eyeballs.

The *eyes* are very small, and adhere to the skin, which passes over them without forming any projection: they have a small spherical lens, and no choroid gland.

The *organ of hearing* consists of a vestibule enclosed in a thick cartilaginous case, without external communication except for the foramina transmitting the *portio mollis*: it consists of two large otolithic sacs, containing each a white chalky mass; the external one being six times the size of the one next the brain: above these sacs are three small semicircular canals. No trace of tympanic cavity or *Eustachian tube*.

The *organ of smell* consists of two oval membranous sacs, pli-

cated internally, and having each a single external aperture upon the upper lip; but without any communication with the mouth,—a structure which the author observed was perhaps the only single character which unexceptionably proved the *Lepidosiren* to be a true fish. The remaining evidence of its ichthyic nature reposed rather upon the concurrence of many less decisive characters.

These characters were stated to be, its covering of large round scales; the mucous ducts of the head and lateral line; the many-jointed soft ray supporting the rudimental pectoral and ventral fins; the gelatinous vertebral chord, united anteriorly to the whole of the basi-occipital, and not to two condyles as in Batrachia; a præ-opercular bone, the intermaxillary bone being moveable; the lower jaw having each ramus composed simply of a post-mandibular and dentary piece; the double row of spinous processes, both above and below the vertebral chord; the green colour of the ossified parts of the skeleton; the straight intestine, with its spiral valve; the absence of pancreas and spleen; the single peritoneal outlet; the position of the anus; the single auricle of the heart; the number of branchial arches, and the internal position of the gills; a long lateral nerve; acoustic labyrinth with large otolithes. These characters, with the nasal sacs opening only externally, prove satisfactorily the *Lepidosiren* to be a true Fish, and not a Perennibranchiate Reptile.

In the class of fishes, Mr. Owen pointed out the interesting relations of the *Lepidosiren* as a link connecting the Cartilaginous fishes with the Malacopterygians, and especially with the *Sauroid* genera, *Polypterus* and *Lepidosteus*, and at the same time making the nearest approach in the class of fishes to the Perennibranchiate Reptiles.

For the species here described Mr. Owen proposed the name of *Lepidosiren annectens*. It is a native of the river Gambia, Africa.

ROYAL IRISH ACADEMY.

January 28.—Sir Wm. R. Hamilton, A.M., President, in the Chair.

Mr. Ball read a Paper on the Remains of Oxen found in the Bogs of Ireland.

Having alluded to the occurrence of fossil remains of oxen in Britain, and the existence of the Auroch or Wild Ox, in some parks in that country, he remarked on the old and generally received opinion, that Ireland could not furnish any evidence of having ever possessed an indigenous ox; and he stated, that a specimen which he received from the sub-marine forest, in the Bay of Youghal, seemed to have been the core of a horn of the fossil ox, often found in Bri-

tain, and supposed to have been the Urus; but this specimen having been lost, he alluded to it, to direct the attention of the Academy to the subject, in the hope of having his view confirmed. He then entered upon the principal object of his paper, which was to show, that the remains of oxen found at considerable depths in bogs in Westmeath, Tyrone, and Longford, belonged to a variety or race, differing very remarkably from any noticed in Cuvier's 'Ossemens Fossiles,' or any other work with which he was acquainted. He concluded by expressing a conviction, that Ireland had possessed at least one native race of oxen, distinguished by the convexity of the upper part of the forehead, by its great proportionate length, and by the shortness and downward direction of the horns. As this fact seems to have escaped altogether the notice of British and continental naturalists, and as analogy in the case of other Irish mammals justified the view, he urged the great probability of the race in question proving to be one peculiar to Ireland.

Mr. Ball exhibited specimens and drawings, and solicited the co-operation of Members of the Academy in effecting a perfect elucidation of the subject, by collecting specimens from the bogs of the country.

April 8.—Dr. Wilde, a visiter, by permission of the Academy, read a paper on some Discoveries he had made at Tyre, relating to the manufacture of the celebrated Purple Dye.

Dr. Wilde stated, that having been engaged in investigating the ruins of Tyre, he discovered several circular apertures or reservoirs cut in the solid sandstone rock close to the water's edge along the southern shores of the Peninsula. These in shape resembled a large pot, and varied in size from two to eight feet in diameter, and from four to five deep; some were in clusters, others isolated, and several were connected in pairs by a conduit about a foot deep. Many of those reservoirs were filled with a breccia solely composed of broken up shells, bound together by carbonate of lime, and a small trace of strontian; large heaps of a similar breccia were found in the vicinity of the pots. This mass, a portion of which Dr. Wilde exhibited to the Academy, is exceedingly heavy, of adamantine hardness, and the shells of which it is composed appear to be all of *one* species, and from the sharpness of their fracture, were evidently broken by art and not worn or water-washed. The portions of shell were examined by eminent naturalists, and are pronounced to be the *Murex trunculus*, which most conchologists agree was one species from which the Tyrian dye was obtained, but until now, no *proof* could be given of its being the actual shell.

Dr. Wilde is of opinion that the reservoirs he discovered were the vats or mortars in which the shells were broken up, in order to obtain the dye (which lies in a sac in the neck of the mollusc inhabiting them,) and showed that it accurately accords with the description of Pliny, who states, that the smaller shells (of which those in the specimen are examples) were broken in *certain mills*.

BOTANICAL SOCIETY OF LONDON.

October 5th.—J. E. Gray, Esq., F.R.S., President, in the Chair.

Mr. Daniel Cooper, the Curator, exhibited a specimen of the natural living fence mentioned at a former meeting, vol. ii. p. 234. Mr. James Rich communicated a translation from the French "On the Formation of Crystals in the Cellules of Plants."

November 2nd.—The President in the Chair.

Dr. F. Bossey read a paper, being the results of an excursion from Woolwich to Cobham, Kent, made in company with several members of the Society. At the commencement of the paper Dr. B. alluded to the general imperfect manner in which the habitats of uncommon species were in general described, and proposed the use of the compass in defining particular habitats. Particular attention was directed to the habitat of *Polypogon monspeliensis* and *P. littoralis*, which were discovered in the marshes east of Woolwich, particularly in front of the south of the *butt* or mound in the Plumstead practice ground.

On ditch banks, forming the east border of the practice ground, *Poa distans*, *P. procumbens*, and *P. maritima*, were observed, and in the water *Zannichellia palustris*, *Potamogeton pectinatum* and *Scirpus lacustris* with the *Polygonum maritimum* of Ray, see vol. ii. p. 234. In the hedge banks towards Plumstead a small patch of *Erysimum cheiranthoides* was noticed. Passing over Plumstead Common to a road called the King's Highway, Dr. B. found in a little wood on the right the *Orobus tenuifolius* of Roth. This plant, which Willdenow, Smith, and Hooker agree in regarding as a narrow-leaved variety of *O. tuberosus*, is considered by Don and others as a distinct species. The characters which are permanent in cultivated plants are given by Mr. D. Don in the 3rd volume of the Memoirs of the Wernerian Society, and sufficiently distinguish it from the common species. In fields, near Darne Wood, the following plants were met with—*Linaria minor*, *Elatine* and *spuria*, *Adonis autumnalis*, *Ajuga Chamæpitys*, *Anagallis cærulea*, *Galium tricorne*, *Papaver hybridum* and *som-*

niferum. In Darne Wood, *Astragalus glycyphyllos, Asperula Cynanchica,* and *Rubus cæsius*. Towards Cobham *Brachypodium pinnatum, Althea hirsuta, Salvia pratensis,* &c. &c.

November 16th.—The President in the Chair.

Specimens of the fruit, bark, and liber of *Bertholletia excelsa* were announced, presented by R. H. Schomburgk, Esq. now in British Guiana. Mr. Chatterley read a paper on the importance of "Botanical Statistics," illustrated by the order *Coniferæ,* which led to much interesting discussion.

November 29th.—The President in the Chair.

This being the second Anniversary of the Society, the Secretary read the report of the Council, from which it appeared that the present number of Members is 100, of which 42 are Resident, 34 Corresponding, and 24 Foreign, 47 having been elected since the last Anniversary. In the Treasurer's report it was stated that the receipts amounted to 71*l.* 16*s.* 6*d.*, and the expenditure to 66*l.* 16*s.* 10*d.*, leaving a balance in the hands of the Treasurer of 4*l.* 19*s.* 8*d.* exclusive of subscriptions for the ensuing year. The President congratulated the Society on its present condition as contrasted with the report of the state of the funds at the last Anniversary, when the Society were 35*l.* 17*s.* 6*d.* in arrears. Donations to the library were announced from 13 Members, and to the herbarium from 42. The number of British plants received amount to 18,592 specimens, including a valuable collection of British *Salices* from Mr. W. Baxter, A.L.S., of the Botanic Garden, Oxford. The number of foreign specimens received amount to upwards of 10,000, including 4000 species, principally received from H. B. Fielding, Esq., F.L.S., Baron Macedo, A. White, and the Botanical Society of Edinburgh. The report also announced that the Council had opened a correspondence with the Botanical Society of Edinburgh, and that an exchange of specimens will annually take place between both Societies. The Council have also caused to be published a list of the Natural Orders and Genera of DeCandolle, together with the Linnæan Classes and Orders, in such a form as to allow of cutting out to paste on the labels of collections: this, together with the Edinburgh Societies' list of species, will form a complete *printed* index to British Herbaria. The report was unanimously adopted. Ballot then took place for the officers of the ensuing year: J. G. Gray, Esq., F.R.S., was re-elected President, who appointed J. E. Children, V.P.R.S., &c., and Dr. D. C. Macreight, F.L.S., Vice-Presidents; John Reynolds, Esq. was re-elected Treasurer, together with Daniel Cooper, Esq., A.L.S., Curator, and George

E. Dennes, Esq., F.L.S., Secretary. The President then delivered an address, in which he expatiated on the advancement the Society had made since the last year, and gave a brief sketch of the progress of Botanical Science for 1837.

DUBLIN NATURAL HISTORY SOCIETY.

We have received the first annual report of the above-named Association, established in March 1838, "for promoting the Investigation of the Natural History of Ireland," and were gratified to see the attempt made to institute a society of this character in the metropolis of Ireland. It already consists of one hundred and thirty-six members, and a museum and library have been founded. The rules are very ample, consisting of thirty-eight articles, which a little further experience in their wording may perhaps condense, while the chief aim of the society is stated to be "undivided attention to the study of the natural history of Ireland by forming a standard collection of species;" and the reading of papers at the evening meetings, "when a free and unrestrained communication of facts would be encouraged." The report above alluded to is unassumingly drawn up, and relates rather to statistics than to the transactions of the meetings. It is to be continued annually, we trust in the form of an address to the members; and we would recommend a little detail being entered into of the proceedings of the bygone year, both as a useful summary to the members themselves, and as valuable to persons at a distance interested in the zoology of the British Islands, and who could scarcely otherwise become acquainted with what discoveries had been made or what additional information had been obtained.

NATURAL HISTORY SOCIETY FOR THE WEST RIDING OF YORKSHIRE.

Henry Denny, Esq. of Leeds, the author of a History of the British *Pselaphidæ**, is at present attempting to establish a Society in the West Riding of Yorkshire, for the promotion of the local Natural History, and we trust he may be successful. This is one of the objects which has been recommended by the British Association, as tending in an eminent manner to render our knowledge of the zoology and botany of the country complete, and the additions which have been made of late years both of new species and of valuable information regarding some previously accounted rare or little known by the researches of local investigators, is ample testimony that the

* We would anxiously recommend the work which Mr. Denny has at present in preparation on the British *Nirmidæ*.

recommendation should be attended to. The plan proposed is nearly that acted upon by the Berwickshire Naturalists' Club, which has now continued for several years, holding five meetings annually, examining the adjacent country during the days of assembling, and bringing together after a frugal but always well-relished dinner the results of the different excursions. There is no subscription, and a few shillings from each member suffices to defray the expense of printing the Transactions and annual address, which already hold an important place in the literature of our natural history. Mr. Denny remarks, "I feel confident, that if such an association were formed for the West Riding, (than which no district of equal extent in the kingdom is richer for varieties of soil, suitable localities, diversity and abundance of its productions,) a large mass of highly valuable materials might be collected, our knowledge of the organised beings surrounding us increased, and much friendly and scientific intercourse carried on, to the mutual benefit of all parties." It will give us satisfaction to learn that Mr. Denny's project has been realised.

ZOOLOGICAL SOCIETY.

August 14, 1838.—William Yarrell, Esq., in the Chair.

A series of skins, belonging to species of the genus *Sciurus*, including, with one or two exceptions, all which are known to inhabit North America, were upon the table; and the Rev. Dr. Bachman, of S. Carolina, brought them severally before the notice of the Members. Six of the species exhibited were new, and for these he proposed the specific names of *Texianus*, *lanuginosus*, *fuliginosus*, *subauratus*, *Auduboni*, and *Richardsoni*. Dr. Bachman's manuscript notes upon the habits and characters of the North American Squirrels, with descriptions of the newly characterized species, were also laid before the Meeting.

The first species noticed by Dr. Bachman is the *Sciurus capistratus* of Bosc, or Fox Squirrel; *vulpinus* of Gmel.; *niger*, Catesby; *variegatus*, Desm.; the Black Squirrel of Bartram. Its essential characters consist in its large size, in having the tail longer than the body, the hair coarse, and the ears and nose white. The dental formula is *inc.* $\frac{2}{2}$, *can.* $\frac{0-0}{0-0}$, *mol.* $\frac{4-4}{4-4}$.

Sciurus Texianus. Texian Squirrel. This name is proposed by Dr. Bachman for an apparently undescribed species which he saw in the Museum at Paris. It was said to have been received from Mexico. In the Museums of Berlin and Zurich, he also found what he conceives to be the same species; and in the British Museum

there is a specimen obtained at Texas by Mr. Douglas, agreeing with the others in almost every particular. Dr. Bachman also states that, among his notes there is a description of a specimen received by a friend from the south-western parts of Louisiana, which, on a comparison with memoranda taken from the other specimens, does not appear to differ in any important particular. Hence, he thinks it probable that this species has a tolerably extensive range extending perhaps from the south-western portions of Louisiana, through Texas, into Mexico.

The Texian Squirrel is about the size of the Fox Squirrel. On the upper surface there is a mixture of black and yellow, and on the under parts deep yellow. The under sides of the limbs, and also the parts of the body contiguous, are whitish. Fore-legs externally, and the feet, rich yellow: ears, on both surfaces, yellow, with interspersed white hairs: nose and lips, brownish white: hairs of tail, rich rusty yellow at base, with a broad black space near the extremity, and finally tipt with yellow.

Dimensions.	in.	lines.
Length of body	13	6
Tail to end of hair	15	0
Tarsus	3	0
Height of ears to end of fur	0	$6\frac{1}{2}$

The Texian Squirrel bears some resemblance to the *Sciurus capistratus*. The latter species, however, in all the varieties hitherto examined by Dr. Bachman, has uniformly the white ears and nose.

This species would appear to replace the *Capistratus* in the south-western parts of America.

Sciurus subauratus. *Sci. corpore suprà cinereo, flavo lavato, infrà austerè aureo, caudâ corpore longiore. Dentes, inc.* $\frac{2}{2}$, *mol.* $\frac{4-4}{4-4}$.

The designation "Golden-bellied Squirrel," and the specific term *subauratus*, are given by Dr. Bachman to a species, of which two dead specimens were procured in the markets of New Orleans by Mr. Audubon. Their size was between that of the Northern Gray, and the Little Carolina Squirrel. There was no trace of the small anterior upper molar generally found in the species of the genus *Sciurus*. The upper incisors are of a deep orange brown colour, and of moderate size: under incisors a little paler than the upper; the head is of moderate size; whiskers longer than the head; the ears are short and pointed, and clothed with hair on both surfaces. The body seems better formed for agility than that of the small Carolina, in this respect approaching nearer to the Northern Gray Squirrel.

The tail is broad and nearly as long as that of the last-named species.

The colour of the whole upper surface is gray, with a distinct yellow tint. The hairs, which give this outward appearance, are grayish slate colour at their base, then very broadly annulated with yellow; then black, and near the apex annulated with yellowish white. The sides of the face and neck, the whole of the inner side of the limbs, feet, and the whole of the under parts, of a deep golden yellow; on the cheeks and sides of the neck, however, the hairs are obscurely annulated with black and whitish; the ears are well clothed on both surfaces with tolerably long hairs of the same deep golden hue as the sides of the face; hairs of the feet are mostly blackish at the root, and some are obscurely tipped with black; hairs of the tail black at the roots, and the remaining portion of a bright rusty yellow; each hair three times in its length annulated with black; the under surface of the tail is chiefly bright rusty yellow; whiskers longer than the head, black.

Sciurus magnicaudatus, Harlan's Fauna, p. 170. *S. macrourus*, Say. Long's Expedition, vol. i. p. 115.

Of this species Dr. Bachman remarks, that although he has seen many specimens labelled under the above name, yet the only true *S. macrourus* which has come under his own observation, is one in the Philadelphia Museum.

Sciurus aureogaster, F. Cuv. et Geoff. Mamm. Californian Squirrel.
Habitat Mexico and California.

Sciurus cinereus. Gmel. Cat Squirrel, Pen. Arct. Zool. i. 137.

A little smaller than the Fox Squirrel; larger than the Northern Gray Squirrel; body stout; legs rather short; nose and ears not white; tail longer than the body. Dental formula, *incis.* $\frac{2}{2}$, *can.* $\frac{0-0}{0-0}$, *mol.* $\frac{4-4}{4-4}$, $=20$.

"This squirrel has many habits in common with other species, residing in the hollows of trees, building in summer its nest of leaves in some convenient crutch, and subsisting on the same variety of food. It is, however, the most inactive of all our known species. It mounts a tree, not with the lightness and agility of the Northern Gray Squirrel, but with the slowness and apparent reluctance of the little Striped Squirrel (*Tamias Lysteri*). After ascending, it does not mount to the top, as is the case with other species, but clings to the body of the tree on the side opposite to you, or tries to conceal itself behind the first convenient limb. I have never observed it escaping from branch to branch. When it is induced in

search of food to proceed to the extremity of a limb, it moves cautiously and heavily, and returns the same way. On the ground it runs clumsily and makes slower progress than the Gray Squirrel. It is usually fat, especially in autumn, and the flesh is said to be preferable to that of any other of our species.

"The Cat Squirrel does not appear to be migratory in its habits. The same pair, if undisturbed, may be found taking up their residence in a particular vicinity for a number of years in succession, and the sexes seem mated for life."

Sciurus leucotis. Northern Gray Squirrel.

Gray Squirrel. Penn. Arct. Zool. vol. i. p. 135. Hist. Quad. No. 272.

Sci. Carolinensis. Godman non Gmel.

Sci. leucotis. Gapper, Zoological Journal, vol. v. p. 206, published in 1830.

Larger than the Carolina Gray Squirrel; tail much longer than the body; smaller than the Cat Squirrel; subject to many varieties of colour.

Dental formula, *incis.* $\frac{2}{2}$, *mol.* $\frac{5-5}{4-4}$, = 22.

Sciurus Carolinensis, Gmel. Little Carolina Gray Squirrel.

This species is smaller than the Northern Gray Squirrel, and has the tail, which is the same length as its body, narrower than in that species. The colour above is rusty gray, beneath white, and not subject to variation.

Sciurus Colliæi. For a description of this species, of which the original specimen is in the Collection of the Zoological Society, Dr. Bachman refers to Dr. Richardson's Appendix to Capt. Beechey's Voyage.

Sciurus nigrescens. A species described by Mr. Bennett, in the Proceedings of the Zool. Soc. for 1833, p. 41.

Sciurus niger, Linn. non Catesby. The Black Squirrel.

A little larger than the Northern Gray Squirrel; fur soft and glossy. Ears, nose, and the whole body, pure black; a few white tufts of hair interspersed. Incis. $\frac{2}{2}$, canines $\frac{0-0}{0-0}$, molars $\frac{4-4}{4-4}$, = 20.

Sciurus Audubonii. Larger Louisiana Black Squirrel.

Sciurus corpore suprà nigro, subtùs fuscescente; caudâ corpus longitudine æquante.

A new species, for which Dr. Bachman is indebted to Mr. Audubon. It has the fur very harsh to the touch, and is rather less in size than the *Sciurus niger.*

Sciurus fuliginosus. Sooty Squirrel.

Sciurus corpore suprà nigro et fuscescenti-flavo irrorato, subtùs

fuscescente ; caudâ corpore valdè longiore : dentes inc. $\frac{2}{2}$, *mol.* $\frac{5-5}{4-4}$.

Dr. Bachman remarks of this species, " I am indebted to J. W. Audubon, Esq., for a specimen of an interesting little Squirrel obtained at New Orleans on the 24th March, 1837, which I find agreeing in most particulars with the specimen in the Philadelphia Museum, referred by American authors to *Sciurus rufiventer*.

" Dr. Harlan's description does not apply very closely to the specimen in question, but seems to be with slight variations that of Desmarest's description of *Sciurus rufiventer*.

" The following description is taken from the specimen procured by Mr. Audubon. It was that of an old female, containing several young, and I am enabled to state with certainty that it was an adult animal.

" I have given to this species the character of 22 teeth, from the circumstance of my having found that number in the specimen from which I described. The animal could not have been less than a year old. The anterior molars in the upper jaw are small ; the inner surface of the upper grinders is obtuse, and the two outer points on each tooth are elevated and sharper than those of most other species. In the lower jaw the molars regularly increase in size from the first, which is the smallest, to the fourth, which is the largest. Head short and broad ; nose very obtuse ; ears short and rounded, slightly clothed with hair ; feet and claws rather short and strong ; tail short and flattened, but not broad, resembling that of the *Sc. Hudsonius*. The form of the body, like that of the little Carolina Squirrel, is more indicative of strength than of agility.

" The hairs on the upper part of the body, the limbs externally and feet, are black, obscurely grizzled with brownish yellow. On the under parts, with the exception of the chin and throat, which are grayish, the hairs are annulated with brownish orange and black, and a grayish white at the roots. The prevailing colour of the tail above is black, the hairs however are brown at base and some of them are obscurely annulated with brown, and at the apex pale brown. On the under side of the tail the hairs exhibit pale yellowish brown annulations."

Sciurus Douglasii, Gray. *Oppoce-poce,* Indian name.

A species about one-fourth larger than the Hudson's Bay Squirrel ; tail shorter than the body. Colour : dark brown above, and bright buff beneath. Dental formula ; *incis.* $\frac{2}{2}$, *can.* $\frac{0-0}{0-0}$, *mol.* $\frac{4-4}{4-4}$, $=20$.

Sciurus Hudsonius, (Pennant). The Chickaree Hudson's Bay Squirrel. Red Squirrel.

The Hudson's Bay Squirrel, a well-known species, is a third smaller than the Northern Gray Squirrel; tail shorter than the body; ears slightly tufted. Colour, reddish above, white beneath. Dental formula: *incis.* $\frac{2}{2}$, *can.* $\frac{0-0}{0-0}$, *mol.* $\frac{4-4}{4-4}$, = 20.

Sciurus Richardsoni. Columbia Pine Squirrel.

Small Brown Squirrel. Lewis and Clarke, vol. iii. p. 37.

Sciurus Hudsonius, var. β. Columbia Pine Squirrel. Richardson, Fauna Boreali-Americana, p. 190.

Smaller than *Sc. Hudsonius*; tail shorter than the body; rusty gray above, whitish beneath; extremity of the tail black.

This small species was first noticed by Lewis and Clarke, who deposited a specimen in the Philadelphia Museum, where it still exists. I have compared it with the specimen brought by Dr. Townsend, and find them identical. Dr. Richardson, who appears not to have seen it, supposes it to be a mere variety of the *Sciurus Hudsonius*.

Dental formula: *incis.* $\frac{2}{2}$, *can.* $\frac{0-0}{0-0}$, *mol.* $\frac{4-4}{4-4}$, = 20.

"The body of this most diminutive of all the known species of genuine squirrel in North America, is short, and does not present that appearance of lightness and agility which distinguishes the *Sciurus Hudsonius*. Head large, less elongated, forehead more arched, and nose a little blunter than *Sc. Hudsonius*; ears short; feet of moderate size. The third toe on the fore-feet but slightly longer than the second; the claws are compressed, hooked and acute; tail shorter than the body; the thumb-nail is broad, flat and blunt.

"The fur on the back is dark plumbeous from the roots, tipped with rusty brown and black, giving it a rusty gray appearance. It is less rufous than the *Sc. Hudsonius*, and lighter coloured than the *Sc. Douglasii*. The feet on their upper surface are rufous: on the shoulders, forehead, ears, and along the thighs, there is a slight tinge of the same colour. The whiskers, which are a little longer than the head, are black. The whole of the under surface, as well as a line around the eyes, and a small patch above the nostrils, smoke-gray. The tail for about one half its length presents on the upper surface a dark rufous appearance, many of the hairs being nearly black, pointed with light rufous: at the extremity of the tail, for about an inch and three-fourths in length, the hairs are black, a few of them slightly tipped with rufous. The hind-feet, from the heel to the palms, are thickly clothed with short adpressed light-coloured hairs; the palms are naked, The sides of the body are marked by a line of black commencing at the shoulder and ter-

minating abruptly on the flanks: this line is about two inches in length and four lines wide.

Sciurus lanuginosus. Downy Squirrel.

Sciurus corpore suprà flavescenti-griseo, lateribus argenteo-cinereis, abdomine albo: pilis mollibus et lanuginosis: auribus brevibus: palmis pilis sericeis crebrè instructis; caudâ corpore breviore.

"A singular and beautiful quadruped, to which I have conceived the above name appropriate, was sent to me with the collection of Dr. Townsend. He states in his letter, 'Of this animal I have no further knowledge than that it was killed on the North-west coast, near Sitka, where it is said to be common: it was given to me by my friend W. F. Tolmie, Esq., surgeon of the Hon. Hudson's Bay Company. I saw three other specimens from Paget's Sound, in the possession of Capt. Brotchie, and understood him to say that it was a burrowing animal.' Sitka is, I believe, the principal settlement of the Russians on Norfolk Sound and Paget's Sound, a few degrees North of the Columbia River.

"The head is broader than that of the *Sc. Hudsonius*, and the forehead much arched. The ears, which are situated far back on the head, are short, oval, and thickly clothed with fur; they are not tufted as in the *Sc. Hudsonius* and *Sc. vulgaris* of Europe, but a quantity of longer fur, situated on the outer base of the ear, and rising two or three lines above the margins, give the ears the appearance of being somewhat tufted. In the Squirrels generally, the posterior margin of the ear doubles forward to form a valve over the auditory opening, and the anterior one curves to form a helix; in the present species the margins are less folded than those of any other species I have examined. The whiskers are longer than the head; feet and toes short; rudimental thumb armed with a broad flat nail; nails slender, compressed, arched and acute; the third on the fore-feet is a little the longest, as in the Squirrels. The tail bears some resemblance to that of the Flying Squirrel, and is thickly clothed with hair, which is a little coarser than those on the back. On the fore-feet the palms are only partially covered with hair; but on the hind feet, the under surface, from the heel even to the extremity of the nails, is thickly clothed with short soft hairs.

"The fur is softer and more downy than that of any other North American species, and the whole covering of the animal indicates it to be a native of a cold region.

"Dental formula: *incis.* $\frac{2}{2}$, *can.* $\frac{0-0}{0-0}$, *mol.* $\frac{4-4}{4-4}$, $=20$.

"The upper incisors are smaller and more compressed than those of *Sc. Hudsonius*; the lower ones are a little longer and sharper than

the upper: the upper grinders, on their inner surface, have each an elevated ridge of enamel; on the outer crest or edge of the tooth, there are three sharp points instead of two obtuse elevations, as in the Squirrels generally, and in this particular it approaches the *Spermophiles*. In the lower jaw, the grinders, which are quadrangular in shape, present each four sharp points.

"On the back and tail there are so many white hairs interspersed, the white spot on the head being merely occasioned by a greater number of hairs nearly or wholly white, that there is great reason to believe that this species becomes much lighter, if not wholly white, during winter.

"In the shape of the head and ears, and in the pointed projections of the teeth, this species approaches the Marmots and Spermophiles; but in the shape of its body, its soft fur, its curved and acute nails, constructed more for climbing than digging in the earth, and in the third toe being longer than the second, it must be placed among the Squirrels."

Mr. Ogilby pointed out the characters of a new species of Muntjac Deer, which lately died at the Gardens. This species is about the same size as the common Indian Muntjac, but has a longer head and tail; has less red, and more blue in the general shade of the colouring, and is readily distinguished by the want of the white over the hoofs, which is so apparent in its congener. The specimen, a male, was brought from China by J. R. Reeves, Esq., to whom the Society is already indebted for many rare and valuable animals, and to whom Mr. Ogilby proposed to dedicate the present species by applying the name of *Cervus Reevesi*. A female specimen which accompanied that here described, is still living and has lately produced a fawn, which is interesting from exhibiting the spotted character common to the generality of the young in this extensive group.

MISCELLANEOUS.

FORMATION OF INDIGO IN *POLYGONUM TINCTORIUM*.

Prof. Morren of Liège in a memoir read before the Academy of Sciences at Brussels, on the culture of, and method of obtaining the indigo from *Polygonum tinctorium*, makes the following statement with respect to the formation of the indigo in the leaves of this plant:—"The indigo," he observes, "is contained in the mesophylle of the leaf especially. It is dissolved originally in a liquid which fills the cells, and in which float pure granules of chlorophylle either inclo-

sing nuclei of cells or bundles of crystals. The formation of the indigo is in connexion with the non-development of the fecula, so that the more there is of this substance the less there is of the blue product. Whence it follows that the young leaves being less feculiferous than the old ones, are more useful.

"The chlorophylle is a formation prior to the fecula, which is developed in separate nuclei in the green granules; but there is nothing to prove that the indigo is influenced by the chlorophylle, or that it is the anthocyan, the blue principle of the chlorophylle, which has any connexion with the indigo, so that the leaves of a bright and uniform green are also those which are best adapted for the extraction of indigo; for the greener and more healthy a leaf is, the more it contains of the blue principle."—*Extract from the Bulletin de l'Académie de Bruxelles*, 1838.

ON A NEW SPECIES OF *CYRENA*. BY H. NYST.

The species of this genus formed by Lamarck at the expense of *Cyclas* of Bruguière, and belonging like those to his *Conchifères dimyaires lamellipèdes*, are all inhabitants of rivers. They are at present all exotic, but formerly they must have been widely spread through Europe, since they are found in a fossil state with *Melaniæ*, *Melanopsides*, and *Paludinæ*, in layers of considerable extent: such is, amongst others, the *Cyrena semistriata*, Desh., which we have discovered in abundance at Kleyn Spauwen, near Maestricht, and which is figured in our "Inquiries on the Fossil Shells of Housselt and of Kleyn Spauwen," Pl. III. fig. 13.

The genus *Cyrena* has been subdivided by Lamarck into two sections, the one containing the species with lateral serrulated teeth, of which Megerle afterwards made his genus *Corbicula*; the other comprehending those with entire teeth, which constitute the genus *Pridonta*, established by Schumacher. The shell under consideration belongs to the first of these sections. It should take its place by the side of the *Cyrena cor*, Lamk., if indeed it be not its fossil representative.

Cyrena Duchastelii, Nob.—Testa cordata, subæquilatera, tumida; scalariter sulcata; natibus fere conjunctis.

Shell cordiform, nearly equilateral, thick, probably grooved, traces of grooves visible towards the hinges in the injured specimen which we have before us. The hinges are very near each other.

We dedicate this species to M. F. Duchastel, who was so obliging

as to present us with the second specimen, which he possessed from the Crag of the County of Norfolk, where Mr. Wood, an English geologist had found it.—*Bulletin de l'Académie de Bruxelles*, 1838.

ON A NEW EXOTIC SPECIES OF *POLYPORUS*. BY PROF. J. KICKX.

Polyporus myrrhinus, Nob.—Graveolens, suberoso-coriaceus, pileo rufescente, strigoso-velutino, zonato, basi subtus tuberculoso; poris rotundis lutescentibus.

Hab. Cuba.

Sessile, unilateral, obliquely and irregularly reniform, plane, thin (its greatest thickness not surpassing 7 mill.), nearly 11 centim. long to 17 centim. broad. Pileus marked with zones of various colours; some brownish-red with short hairs, very dense and soft, giving the surface a velvety appearance; others alternating with the first, narrower, greyish, with stiff erect hairs. Lines of growth deep. Base inferiorly tuberculous. Margin thin, straight, presenting now and then small perforations arising from foreign bodies inclosed by the plant during its growth. Hymenium yellow, of a deeper tint towards the outer margin. Pores very small, approximate, rounded, entire, decurrent along the basal tuberosities of the pileus. Sporidia white.

The *Polyporus myrrhinus* belongs therefore to the group of annual and coriaceous Apodes, and should take its place by the side of *P. hirsutus*, Schrad., *Lundii*, Fr., and *Polyzonus*, Pers. The odour which this species diffuses is that of myrrh. It is impossible to mistake it. Besides, there is a method which I have had recourse to more than once for the diagnosis of vegetable emanations, and with which I have almost always succeeded. It consists in passing the object over a bottle containing ammonia for some minutes. The experiment proves that by this process (the theory of which however I do not take upon myself to give), we strengthen without altering the aromas, the weakness of which would otherwise have hindered their being recognised.

A character so easy to prove as the existence of the resinoso-balsamic odour, which we have mentioned, seemed to merit being expressed in the specific name.—*Ib.*

ON THE VERNATION OF THE *CYCADACEÆ*. BY F. A. W. MIQUEL.

In all botanical works, we find quoted, as one of the characters of the *Cycadaceæ*, the circinate arrangement of the young leaves, and from this at one period was inferred their affinity to Ferns. The au-

thor's researches have shown that this fact is not general. On a specimen of *Encephalartos affinis*, Lehm., he found a bud composed of young leaves shortened, the points of which converged at their summit, and the leaflets on each side of the rachis were imbricate (on account of the shortening of the latter), and they were applied one against the other by their front surface. The same phenomenon is seen in the *E. Altensteinii* and *horridus*, Lehm. The terminal bud in the species of this genus is not in general developed except at intervals of two or even of several years: in the young plants and the lateral buds of great stems very often only a single leaf or a very small number of leaves is developed at a time. The growth of the young leaves is caused by the extension of the rachis and of the leaflets. The *E. spiralis*, Lehm., likewise presents the same characters.

In the *Zamia*, Lehm. the leaves present a development altogether different. In the *Z. pumila, media*, the young rachis in the bud is bent in the form of the head of a crosier, but the two series of leaflets are imbricated on each side and applied one against the other, so that their summit is directed downwards by the gyrate arrangement of the rachis.

Another disposition of the young leaves is noticed on *Cycas circinalis* and *revoluta*, Thunb. Their rachis as well as the leaflets are bent like the head of a crosier, each one having its own axis of involution as in the Ferns.

These different characters in the disposition of the leaves appear to merit consideration with respect to their use in defining the genera; and M. Miquel, notwithstanding the small number of species which he has been able to observe, is induced to attribute some importance to these differences which have hitherto escaped most botanists.—*Extract from the Bulletin des Scienc. Phys. de Néerlande*, t. i. p. 129.

ON THE SYSTEMATIC ARRANGEMENT OF THE *CHRYSIDIDÆ*.

M. Klug has given a systematic arrangement of the family of insects called *Chrysididæ*. He first separates the genus *Cleptes*, which is sufficiently distinguished from *Chrysis* by the abdomen, arched below and above, terminating in a point and consisting of more than four segments, whilst in the latter the abdomen is flat beneath, blunt at the point, often broad, consisting only of three, or at the most of four segments: hence *Cleptes* might be separated as a sub-family, *Cleptidæ*, and might then be considered as following *Chrysis*, and

thus the *Oxyuri* would be connected with *Cleptes*, as *Chrysis* is with the *Chalcidites*, and form a commodious transition to the *Formicariæ*.

Among the *Chrysididæ* M. Klug first distinguished those which are characterized by the difference of the number of abdominal segments in the two sexes. The disappearance of the submarginal and discoidal cells in the fore wing here indicates an approach to the second chief division of the *Chrysididæ*, yet it appears more suitable to place them not at the end but at the head of the first division, and thus entirely at the head of the *Chrysididæ*. Only one genus belonging to that section *Parnopes*, which is distinguished by the porrect linear mouth, is yet known. To this a new genus is now added, *Anthracias*, a female, with two abdominal segments and with a short mouth more like that of *Chrysis*. The *Chrysididæ* with an equal number of abdominal segments in both sexes are divided from the form of the body into oblong and round, the first with distinct lower marginal and discoidal cells in the fore wing and simple claws, the last with obsolete cells and cleft claws. In the divisions themselves the generic characters should be taken from the formation of the mouth alone, according to whether it, or especially the ligula as in *Parnopes*, be linear and porrect or not, and at the apex emarginate or rounded, or lastly short and almost conical. In the first division with simple claws, next to *Parnopes*, or rather *Anthracias*, a new genus *Leptoglossa* should follow, not dissimilar to *Euchroeus*, with a porrect ligula and emarginate at the apex; then *Pyrochloris*, also with a porrect ligula and rounded at the apex; after which *Euchroeus*, subdivided according to whether the apex of the abdomen (as is usually the case here) is serrated, or indented, or quite unarmed; and then the genus *Stilbum*, which hardly differs sufficiently from *Euchroeus*. The conclusion of the first division would be formed by the genus *Chrysis*, which is the most abundant in species, and which might be much subdivided from the structure of the mandibles, completeness of the marginal cells in the superior wings, and the direction of the nerves forming them, projection of the scutellum, and the armature of the apex of the abdomen, but is nevertheless well characterized by the short nearly conical ligula. In the section of *Chrysididæ* with divided claws, the difference between the genera *Elampus* and *Hedychrum* consists either, as in *Chrysis*, in the short or conical ligula, or as in *Euchroeus* and *Stilbum*, only in the more projecting ligula emarginate at the apex and without regard to the projection of the scutellum.—*From the Bericht der Berliner Akademie, &c., for* 1839.

British Coleoptera Delineated, consisting of Figures of all the Genera of British Beetles. Drawn in outline by W. Spry, M.E.S. Edited by W. E. Shuckard, Librarian to the Royal Society.

We have just seen the first two numbers of this work, which promises to be of considerable assistance to the British Entomologist; it is to consist of a series of figures in outline of all the genera of British Coleoptera, drawn by Mr. Spry and edited by Mr. Shuckard. As the distinctions of form are sometimes so peculiar that it is scarcely possible for the most elaborate description to convey a correct idea of them, we consider this work a very happy conception; and as we have no doubt that the execution will continue in the spirit and with the care with which it commences, we certainly think that it deserves the patronage of all who cultivate the delightful science of entomology, for its very moderate price must meet the means of all.

METEOROLOGICAL OBSERVATIONS FOR APRIL, 1839.

Chiswick.—April 1. Rain. 2. Overcast. 3, 4. Bleak and cold. 5. Snowing. 6. Cloudy and cold. 7. Fine. 8. Snowing. 9. Bleak and cold. 10, 11. Fine but cold. 12—14. Cloudy and cold. 15. Overcast. 16. Very fine. 17. Showery. 18. Boisterous with rain. 19. Very fine. 20. Showery. 21. Fine. 22. Very fine. 23. Rain. 24—26. Fine. 27. Dry haze. 28—30. Very fine.

Boston.—April 1. Fine. 2. Stormy. 3—7. Cloudy. 8. Cloudy: sleet early A.M. 9. Cloudy. 10. Fine. 11—15. Cloudy. 16. Fine. 17, 18. Rain. 19. Fine: rain early A.M. 20, 21. Fine: rain A.M. and P.M. 22. Fine: rain early A.M. 23. Rain. 24—26. Cloudy. 27. Cloudy: rain A.M. 28—30. Fine.

Applegarth Manse, Dumfries-shire.—April 1. A most inclement day: snow on hills. 2. The same: snow on hills melting. 3. The same: bitterly cold. 4. Another piercing day: cloudy P.M. 5. Still extremely cold: snow showers. 6. Wind fallen: more temperate. 7. Moderate day: still no vegetation. 8. Piercingly cold and withering. 9. Dry and cold: frosty mornings. 10. Sun warm, but wind cold and withering. 11. Milder, but still no spring. 12. Great increase of temperature. 13. Sun warm: wind moderate but parching. 14. Moderate day: vegetation commencing. 15. The same: temperature lower: cloudy. 16. Threatening rain: showery: very wet P.M. 17. Showers: rain: hail: cleared P.M. 18. Frequent showers: rain and sleet: snow. 19. Violent wind: showers of hail. 20. Dry and cold: vegetation at a stand. 21. Dry: temperature rising. 22. Foggy morning: drizzling day. 23. Clear: temperature increasing. 24. The same: cool evening. 25. Temperature increasing: clear sun. 26. Cloudy: threatening: cleared up P.M. 27. Clear and fine: hoar frost morning. 28. The same: cloudy P.M. 29. Fine spring day. 30. Remarkably fine spring day.

Sun 25 days. Rain 4 days. Snow 2 days. Hail 2 days. Frost 3 mornings.
Wind easterly 13 days. Southerly 12 days. Northerly 2 days. Westerly 3 days.
Calm 11 days. Moderate 7 days. Strong breeze 4 days. Stormy 5 days. Brisk 3 days.
Mean daily range of barometer 0·092. Mean nightly range 0·080. Mean range of 24 hours 0·172.
Mean daily range of thermometer 10·4.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. ROBERTON; *by* Mr. THOMPSON *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. VEALL *at Boston, and by* Mr. DUNBAR *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1839. April.	Barometer.						Thermometer.									Wind.				Rain.				Dew point
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8¾ a.m.	Dumfries-shire.		London: Roy. Soc.			Chiswick.		Boston. 8¾ a.m.	Dumfries-shire.			London: Roy. Soc. 9 a.m.	Chiswick 1 p.m.	Bost.	Dum. fries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	8½ p.m.	Fahr. 9 a.m.	Self-register. Max.	Self-register. Min.	Max.	Min.		9a.m.	9pm.										
1.	29·586	29·672	29·601	29·27	29·66	29·83	41·7	46·3	40·7	45	38	43	40	34	E.	E.	E.	E.	·116	·07	…	…	38
2.	29·766	29·929	29·761	29·52	29·98	30·08	38·8	41·0	38·9	39	37	40	36	33	NE.	E.	E.	E.	·088	…	…	…	36
3.	29·896	29·974	29·910	29·64	29·99	30·03	35·9	36·6	35·6	36	31	35	35	32	NE.	NE.	E.	E.	…	…	…	…	33
4.	29·986	30·028	29·939	29·67	29·98	29·94	35·5	36·0	33·9	37	32	36	35½	31½	NNE.	NE.	E.	E.	…	…	…	…	33
5.	29·802	29 995	29·827	29·54	29·83	29·99	33·5	34·3	34·0	41	34	37·5	36½	32	NE.	E.	E.	E.	·061	·56	…	0·00	31
6.	30·158	30·358	30·154	29·88	30·16	30·32	40·2	40·7	34·0	43	24	38	38½	32	NNE.	NE.	E.	SE.	·340	…	…	…	33
☾ 7.	30·398	30·417	30·413	30·04	30·40	30·37	38·6	39·3	30·5	49	31	38	36½	29½	NNE.	E.	E.	ESE.	…	…	…	…	29
8.	30·320	30·348	30·333	29·88	30·38	30·42	40·3	41·4	34·8	43	32	40	38½	27½	NNE.	E.	E.	ESE.	…	·01	…	…	32
9.	30·352	30·434	30·373	30·05	30·50	30·60	38·8	39·7	35·0	41	36	40	36½	30½	NNE.	E.	E.	E.	…	…	…	…	32
10.	30·444	30·550	30·455	30·10	30·65	30·65	42·4	43·2	37·3	52	29	43	39½	27½	NE.	E.	E.	ENE.	·027	…	…	…	33
11.	30·518	30·543	30·442	30·11	30 67	30·54	41·4	42·7	33·2	53	37	40·5	36½	28	NNE.	NE.	E.	ENE.	…	…	…	…	33
12.	30·282	30·307	30·228	29·82	30·43	30·34	42·6	43·3	37·2	50	42	44	50	35½	N.	NE.	NE.	E.	…	…	…	…	37
● 13.	30·272	30·278	30·242	29·80	30·29	30·21	44·8	45·3	41·3	47	41	46	50	42½	N.	N.	NE.	E.	…	…	…	…	38
14.	30·232	30·247	30·215	29·75	30·23	30·20	45·7	46·4	43·7	55	42	45	48	37	W.	NW.	calm	SSW.	…	…	…	0·50	39
15.	30·138	30·140	29·975	29·58	30·05	29·84	48·5	49·3	45·2	53	40	50	44	42½	SW.	SW.	calm	S.	…	…	…	…	39
16.	29·792	29·836	29·535	29·27	29·63	29·44	50·2	50·8	44·6	60	44	52	43	41	S.	S.	calm	S.	…	·01	…	…	37
17.	29·436	29·457	29·409	28·83	29·24	29·27	48·4	49·4	45·5	55	39	46	41½	40½	W. var.	SW.	SW.	SSW.	…	·32	…	…	42
18.	29·450	29·578	29·491	28·97	29·27	29·36	47·2	47·6	40·9	58	46	43·5	42½	35	S.	SW.	SW.	W.	·205	·20	·14	…	42
19.	29·662	29·965	29·646	29·05	29·50	29·74	51·4	52·0	40·7	59	33	48	44	33	W.	W.	W.	W.	·180	…	·21	…	42
☽ 20.	30·082	30·235	30·069	29·52	29·95	30·13	49·8	50·7	40·8	55	37	47·5	47	37	W.	NW.	W.	NW.	…	·01	…	…	45
21.	30·260	30·273	30·260	29·67	30·18	30·22	48·7	49·5	41·3	55	32	48	47	39½	WNW.	W.	calm	W.	·033	…	·03	…	42
22.	30·268	30·270	30·168	29·76	30·20	30·07	52·3	53·5	42·7	61	46	50	43	39½	S.	W.	calm	SW.	…	·16	…	…	40
23.	29·984	30·004	29·958	29·40	29·92	30·03	51·3	51·8	47·4	55	39	52	49½	45	S.	W.	calm	ENE.	·155	·12	·30	…	43
24.	30·078	30·111	30·075	29·57	30·06	30·12	45·8	46·4	42·3	55	28	45	48	44	NW.	N.	N.	ENE.	·172	…	…	…	46
25.	30·074	30·090	30·038	29·58	30·07	30·04	44·6	46·0	36·9	63	34	45	49	40	NW.	NE.	calm	SE.	…	…	…	…	41
26.	30·148	30·219	30·139	29·65	30·08	30·15	44·3	50·4	39·2	54	38	43·5	47	45½	NNE.	SE.	calm	S.	…	…	…	0·48	38
27.	30·238	30·262	30·234	29·70	30·20	30·24	48·7	49·3	43·6	61	38	52	47	33½	SE.	SW.	calm	SSW.	…	…	…	…	37
○ 28.	30·340	30·335	30·313	29·77	30·30	30·28	47·8	49·4	42·0	63	30	54	51	37	NNW.	E.	calm	SSW.	…	…	·07	…	43
29.	30·250	30·262	30·182	29·67	30·10	30·10	48·8	49·9	42·6	68	37	56·5	50½	46	E.	E.	calm	SW.	…	…	…	…	42
30.	30·148	30·145	30·039	29·62	30·05	30·02	57·3	58·7	46·7	73	41	56·5	56	49½	E.	NW.	calm	S.	…	…	…	…	43
																							45
Mean.	30·078	30·142	30·047	29·62	30·108	30·088	44·8	46·0	39·7	52·63	36·26	45·1	43·5	36·7					Sum. 1·377	1·46	0·75	0·98	Mean. 37·9

XXXIII.—*Miscellanea Zoologica.* By George Johnston, M.D., Fellow of the Royal College of Surgeons of Edinburgh. With Plate VI.*.

VII. The British Nereides.

Class Annelides. Order Errantes.

Character. *Head* usually distinct and antenniferous: *proboscis* very large, with one or two pairs of *jaws* in most: *segments* numerous, co-ordinate; the *feet* highly developed, furnished with spines and bristles: *branchiæ* either obsolete or in the form of lobules or papillæ inserted generally at the apex of the feet: the *tentacular cirri* rarely wanting.

1. Nereis, *Linnæus.*

Char. *Head* antenniferous, the *antennæ* small; *palpi* two, larger, mammillate; *proboscis* with two horny falcate *jaws*; *segments* numerous, the first with four *tentacular cirri* on each side; *feet* bizamous, variously lobulated, furnished with a dorsal and ventral *cirrus*.

Observations. The body of the *Nereis* is always vermiform, insensibly tapered towards the tail, somewhat truncate in front, and composed of numerous narrow segments: the back roundish, but the ventral surface is flattened, and marked down the middle with an impressed line. The head is distinct, a little contracted in front, and furnished with two pairs of eyes placed on the occiput, the one before the other. The small subulate antennæ are inserted on its frontal margin (Plate VI. fig. 1 *a*, *a*.); and, in general, we find two of these organs, which are guarded, on each side, by a thick palpus distinctly formed of two articulations, the apical capable of being retracted within the other (fig. 1 *a*, *p*). The large cylindrical exsertile proboscis is divided into two rings, and its surface is roughened with minute corneous prickles, more or less numerous in the

* This plate will form part of the Supplement to the present volume.

various species, and distributed in annular rows or limited patches: the orifice is destitute of tentacula, but armed with two powerful jaws curved like a sithe and serrulated on the inner margin (fig. 1 *a*, *pr.*). The first segment of the body (fig. cit. *s.*) is often larger than the following; and from its anterior margin four pairs of tentacular cirri arise (*t*), which spread out on each side of the head in the form of tapered filaments. The feet are homologous throughout and protuberant, formed of two branches coalescent at their insertion with the trunk; and each branch is furnished with a spine, or sometimes with two or three spines, and one or two bundles of bristles (fig. 1 *b.*): the latter are two-jointed, the basilar portion being thickened towards its extremity, which is deeply cleft to receive the terminal piece into a sort of socket (fig. 1 *c.*): this piece is sometimes long, straight, and subulate, at other times short, flattish, and slightly curved. The cirri are always slender and tapered; we find one at the base of each branch of the foot, and that of the ventral branch is invariably shorter than the one pertaining to the dorsal (fig. 1 *b*, *c.*). The branchiæ, according to Savigny, are constituent parts of the feet, consisting of three fleshy papillæ which occupy their extremity (fig. 1 *b*, *b.*). Two of these lobe-like appendages are fixed to the dorsal branch, one under the superior cirrus and one under the setigerous tubercle; and the third is situated under the ventral branch, between the setigerous tubercle and inferior cirrus. The form of these papillæ, as well as their relative size, often varies on the different parts of the body, but they are found on all the feet, excepting, sometimes, on the second and third pairs, where they are more or less rudimentary. Audouin and Milne Edwards deny their branchial character, since they are not more vascular than the other lobules of the foot; but at the base of these organs there is a vascular net-work, which appears to the naturalists mentioned to be the principal seat of respiration. The anal segment is always terminated with two styles.

1. *N. pelagica*, body brownish, more or less tinted with green; post-occipital segment nearly twice as large as the following; cirri shorter than the pa illary processes of the feet. Plate VI. fig. 1.

Nereis pelagica, *Linn. Syst.* 1086. *Bast. Opusc. Subsc.* ii. 133. *tab.* 6. *fig.* 6. *Turt. Gmel.* iv. 86.—N. verrucosa, *Mull. Zool. Dan. prod.* 217. *no.* 2628.—N. cœrulea, *Penn. Brit. Zool.* iv. 93. *tab.* 27. *fig. sup.* (*edit.* 1812.). *Turt. Gmel.* iv. 88. *Turt. Brit. Faun.* 135. *Stew. Elem.* i. 390. *Bosc. Vers,* i. 170.—Lycoris viridis, *Johnston in Zool. Journ.* iv. 419.—L. margaritacea, *Ibid.* 420; *and in Mag. Nat. Hist.* vii. 230. *fig.* 42.

Hab. Under stones, between tide marks, common.

Desc. *Body* from four to six, or, when fully extended, even eight inches long, semicylindrical, of the thickness of a large quill, tapered towards the tail, of a brown colour more or less deeply tinted with metallic green, particularly near the head and on the anterior margins or sides of the segments, and in certain lights iridescent. *Head* square, with four *eyes*, pointed in front, on which are two small *antennæ*; *palpi* much larger, two-jointed, the apical joint minute: *tentacular cirri* in four pairs, greenish, setaceous, the superior reaching to the margin of the fourth segment and longer by a third than the second pair, which again are nearly twice the length of the inferior pairs: *mouth* inferior, with a large cylindrical protrusile *proboscis* divided into two portions by a circular fold, armed with two strong jaws, around which are placed, on as many swellings, six distinct patches of small black prickles, the side patches larger than the others; two still smaller patches are situated just under the projecting lobe of the head, while at the very base of the proboscis we find a band of similar prickles, some larger than others, arranged in several irregular series: *jaws* falcate, horn-coloured at their insertions, the upper half dark brown with six strong serratures on the inner edge, the apex forming a seventh: first *segment* footless, twice as large as the following, scored with faint whitish lines or sometimes spotted; and oblique lines of the same kind may be seen, with a magnifier, on the sides of the other segments, of which, in a large specimen, there were 123, smooth, excepting that across the front margin of a few of the anterior segments a line of minute granules is very often visible: *feet* nearly all alike, the *cirri* short, the terminal or *branchial lobules* conical, nearly equal on the anterior feet, but towards the middle of the body the superior becomes larger and more prominent than either of the others; *setigerous tubercles* small,

the *bristles* of the superior fewer and more slender than those of the inferior, all of them two-jointed, the terminal piece obliquely set, setaceous, smooth, liable to be broken off: *spines* one to each bundle of bristles, acute, dark-brown: tail terminated with two short *styles*.

I have seen specimens which were of a uniform grass-green colour, tinted only with fuscous-brown about the head. At some seasons of the year, in autumn especially, the body is often blotched with large irregular yellow patches, and traversed with red lines, occasioned by the viscera appearing through the skin. A red vessel may be always traced down the middle of the back, giving off, to each foot, a small branch, which is again slightly ramified; and a similar vessel runs along the flat ventral surface, which is marked with a median furrow. But after being macerated in spirits the colours entirely disappear, the worm becoming of a uniform dead yellowish white with a pearly gloss, most distinct on the belly, and a tinge of brown sometimes remains on the back. When allowed to die gradually in sea-water, the animal often pushes forth its well-armed proboscis, which is marked with pale anastomosing lines in a longitudinal direction, probably of a muscular character. In dying it relaxes considerably. Fresh water is an immediate poison to such individuals as are taken from the sea-shores; yet a partial mixture is not unfavourable to its habits, for the species is to be found abundantly burrowing, like an earth-worm, in mud in the brackish water of our tide ways and littoreal marshes.

The figure in the 'Magazine of Natural History' is too short proportionably, and does not give a good idea of the worm. That either of Basten or of Pennant is sufficient to identify their species with the one before us: and I have taken these figures as my guide to the synonyms quoted, for the descriptions do not always tally; but to expect a coincidence between the descriptions of Linnæus or Muller and those drawn up by naturalists of the present day would be unreasonable. I cannot refer *Nereis pelagica* to any species described by Audouin and Milne Edwards. Their description and figure of *N. Beaucoudrayi* show that it is very nearly allied, but it differs in having only 100 segments, though of equal or rather superior

size; in the first segment not being larger than the others; in the jaws having ten serratures; and in the greater elongation of the tentacular cirri.

The changes which the Annelides pass through, from the egg state to their maturity, have not been traced by any one, and the general belief appears to be that none of the class undergoes any metamorphosis, proceeding from the egg with all the characters and lineaments of the parents. I have no direct observation to oppose to this belief, which, however, I have been led to think is questionable. In Plate VI. figure 2. represents what seems to me to be the young of a *Nereis,* probably of *N. pelagica,* and the differences between it and the adult are not inconsiderable. The tentacula and tentacular cirri, it will be observed, are wanting, while the head is large and well developed; and there is a pair of large clavate organs at its junction with the first segment, by the aid of which the little creature appears to move through the water, for in this stage of its life it is an excellent swimmer as well as a swift creeper. There is a prominence at the base of each, perhaps the buds of future tentacular cirri; and here we observe underneath some minute ciliated organ, by whose play a current of water is driven violently along the sides. By the play of other ciliated organs at the tail, similar currents are there created and kept up; and the whole process forcibly recalls to memory the mechanism by which respiration is carried on in many of the edriophthalmous Crustacea. The eyes are in a straight line, and not less distinct than in the adult. The feet are well developed, bizamous: the caudal segment rounded, of a dark colour, and ciliated all round. I found these supposed young in the beginning of September amongst Confervæ: they were about two lines in length, and very active.

The luminous animalcule sometimes to be seen on the shells of oysters, and delineated by Baker, 'Employm. for the Micros.' p. 399. pl. 15 A.) seems to be the same worm, a little further advanced. The tentacula are now developed, as well as a single pair of the tentacular cirri. "This little insect, says Baker, "can emit or conceal its light; and sometimes its lustre is so bright as to be discoverable even in open daylight, especially on being touched or disturbed. Its light is bluish like that of the glowworm, or a spark of burning brimstone."

Plate VI. fig. 1. *Nereis pelagica*, of the natural size; 1 *a*. The head and proboscis magnified; 1 *b*. A lateral view of one of the feet; 1 *c*. Two bristles. Fig. 2. The young? of *Nereis pelagica*.

2. *N. margaritacea*, of a uniform mother-of-pearl colour, post-occipital segment equal in breadth to the two following; jaws with five or six serratures, the apex plain; superior cirrus elongate, the inferior lobed at the base; bristles numerous, the dorsal brush with two, and the ventral with four spines. Plate VI. fig. 3.

Nereis margaritacea, *Leach in Supp. Encyclop. Brit.* i. 451. pl. 26. *Audouin and M. Edwards in Ann. des Sc. Nat.* xxviii. 217. *Wilson in Encyclop. Brit.* (*last edit.*) xi. 220.—N. margarita, *Montagu in Lin. Trans.* vii. 82. *Turt. Brit. Faun.* 135.—Lycoris margaritacea, *Lam. Anim. s. Vert.* v. 312. *seconde édit.* v. 550. *Stark, Elem.* ii. 139.

Hab. Amongst the rocks at Milton, rare, *Montagu*. Coast of Berwickshire, also rare. Mr. Wilson informs us that "this species is common near the Bell Rock, and is subject to great variation of colour," but the latter remark probably flows from a confounding of more than one species together.

Desc. *Body*, about four inches long, vermiform, rounded dorsally and flattened on the belly, of a uniform mother-of-pearl colour, iridescent, the feet tinted with a dusky pale green. *Head* corneous, brown, subquadrangular: *eyes* four, very distinct, occipital, blackish: *antennæ* and *palpi* similar to those of *N. pelagica*, nor is there any material difference in the *proboscis*, but the *jaws* are armed with only five or six denticulations, and the point is longer and smooth: *tentacular cirri* subequal, reaching to the posterior margin of the post-occipital segment, which is twice as broad as the following: *segments* rather narrow; the anterior with small feet, which become gradually larger as we reckon backwards, attaining their maximum of development behind the middle, whence they again lessen: *superior cirrus* longer than the branchial? lobules; the *inferior cirrus* of the anterior feet simple, that of the more developed feet with a lobe and short filament at its base: *bristles* in two considerable brushes, colourless, jointed, the terminal piece long and setaceous; *spines* conical, corneous, some darker than others.

Plate VI. fig. 3 *a*. The head of *Nereis margaritacea*, with the proboscis protruded; 3 *b*. A jaw separated and highly magnified; 3 *c*. An anterior foot (from the twelfth segment); 3 *d*. A foot from near the middle of the body, viewed laterally.

3. *N. bilineata,* body tile-red with two white lines down the back; segments about 120; feet uniform with conoid papillary processes, the dorsal longer and larger than the others; superior cirrus elongated. Plate VI. fig. 4.

Hab. In old shells, Berwick Bay.

Desc. *Body* from three to four inches long, $\frac{2}{10}$ths or $\frac{1}{8}$th broad, semicylindrical, tapered towards the tail, of a tile-red colour marked along the back with two snow-white lines, the narrow space between them being of a fine dark red colour, glossed with a pearly purple lustre, more especially on the ventral surface. *Head* small, the front as usual pointed with two conical *antennæ* longer than its own diameter, and furnished at each side with a large bi-articulate *palpus*: *eyes* four, black and very distinct: *mouth* inferior, the *proboscis* roughened with black prickles: *jaws* falcate, rather small and slender, corneous, crenulate on the inner edge, the crenulations four or five and not deep, the brown curved extremity plain: *tentacular cirri* four on each side, setaceous, of unequal lengths: *segments* 118, very narrow, the first broader than the following but not equal in breadth to two united, convex dorsally, smooth; *feet* uniform, the *superior cirrus* elongate, surpassing the dorsal branchial? papilla, which is longer and much larger than the others: *bristles* of the upper tubercle few, those of the lower bifasciculate, two-jointed, the apical joint smooth, often broken away from the lowermost bristles: *spines* brown, acute; ventral surface flat: *tail* with two short styles.

When macerated in spirits the lines and red colour are completely removed, and the body becomes of a uniform pearl-grey.

I have occasionally found this beautiful species concealed in old univalve shells brought up, with other rubbish, on the lines of our fishermen; one individual was taken from a shell of *Fusus corneus,* which appeared at first to be fully occupied with a Hermit-lobster.

Plate VI. fig. 4. A side view of the foot of *Nereis bilineata,* from about the middle of the body.

[To be continued.]

XXXIV.—*On the* Pinus *and* Abies, *with remarks on a New Species.* By Captain S. E. Cook, R.N.

In the paper which was given in a preceding Number (vol. ii. p. 163.) the general distribution of the genera through Europe was stated, as far as my observations and information at that period enabled me to do. Since that time an addition to our knowledge of this branch has been made by the ascertaining a species which was first announced by me to exist in the mountains of Ronda, the bearings of which on the positions laid down as to the pinology of Europe are too important not to require its introduction into the system. My information respecting it was too vague, except as to the locality, and that it differed from all the species in the vicinity, to enable me to do more than suppose, that, as I had found the upper parts of the Sierra de Cuenca, which bear some analogy to the mountains of Ronda, clothed with *P. sylvestris*, that it might possibly be that species; but having only conjecture to guide me, I published the notice with the view of drawing the attention of other travellers to the subject.—'Sketches in Spain,' vol. ii. p. 239.

It was the more mortifying to me to leave this point undetermined, owing solely to the late period which my information was obtained, because I had previously planned and actually commenced a section of the district which would have carried me quite through the centre of the forest, when the death of the horse I rode at Antequera obliged me to return to Malaga, and I had no opportunity of again undertaking it. We are indebted to M. Boissier, who is, I believe, a naturalist of Geneva, for the information that the tree in question is a new and undescribed species of the silver fir.

Great as the interest is to those engaged in the study of this subject by the discovery or observation of a new species, it is enhanced in this instance by its bearing on and connexion with the pinal vegetation of Europe; and we shall now proceed to place the *Pinsapo**, by which provincial name it is most properly designated, in its true position, in which it

* The term I believe to mean literally gummy, exuding resins.

affords beautiful proofs of the order and harmony with which the operations of nature are found to be conducted whenever they are closely investigated.

The Serrania de Ronda is a mountainous region rising abruptly from the shores of the Atlantic and Mediterranean and from the newly raised plains of Western Andalusia, which bound it on three sides, its eastern boundary being continuous chains connecting it with the great mountainous system of the interior of the Peninsula. It thus forms the bulwark of Spain to the Atlantic, the vapours of which are arrested by its higher summits, giving the region a character of comparative humidity, and imparting to its valleys extreme fertility. The height of S. Cristobal and the Sierra de la Nieve, the most elevated summits, may be taken at six to seven thousand feet, and high upon their flanks is placed the *Pinsapo*, where it forms a zone above the *P. Pinaster*, which was stated in the last paper to occupy the lower valleys of the same district.

The resemblance of this Hesperian region to the Peloponnesus, with which it very nearly corresponds in latitude, altitude, and relative situation, both to the adjacent continent and the adjoining sea, is too striking not to require notice; and as we have seen in a preceding paper the flanks of Mount Taygetus are covered with a silver fir, we have the new and curious information that this genus forms three grand divisions, extending from the Altaian Chain through central Europe, and ending at a moderately high elevation at its southern extremities of Greece and Western Spain.

The next point to determine is the connexion of these localities with the central zone, and the demarcation or limits of the extension. There is little doubt that that of the Grecian division must be sought for in the Apennines, and if, as I believe, the genus is found to be indigenous at Camaldoli in Tuscany, it requires examination, and the attention of those who reside in or may visit the district is earnestly called to the subject. If not found there it must be sought for in the Southern Alps, and especially where a zone of beech, which is met with in the Abruzzi, points out in that latitude the silver fir as the next superior member of the forest.

In Spain we pass at once from the extreme south to the

valleys of Navarre and the Western Pyrenees, and it requires close examination to ascertain whether the species which is found in those comparatively genial valleys belong not to the southern division, and if so, whether, as is possible, it be identical with that which occupies the great zone in the highest valleys of the range at the back of the Maledetta and Mont Perdu.

From the description of the localities above mentioned, it might be inferred, that the natural habitats of the silver fir are rather characterized by humidity. I have no doubt it is so, and in attentively considering its natural position in Europe, we find that in the regions where dryness of atmosphere predominates, it is replaced by its congeners the *Pinus* of the corresponding zone. This observation is of material importance as to the œconomic value of the tree, because it would point out the species as particularly suited to most parts of these islands, of which the climate seems peculiarly fitted to its cultivation on an extended scale.

That the *Pinsapo* should have remained so long unnoticed is less singular than that of many other points connected with the natural history of the same country, which have been left equally unobserved. The locality which it occupies is of small extent; and it is not only unnoticed by the Moorish writer of Arab agriculture who wrote in the twelfth century, and was well acquainted with the arboreal vegetation of Andalusia, but I believe it was unknown in the Arsenal at Cadiz, where, from the dearth of timber, it would have been invaluable, though its total destruction would have probably been the result of the discovery. The order of position of the pine in that portion of Spain, by observation of the Sierra de Macael and other ranges to the east and west of the same district, is, ascending, *P. halepensis* and *Pinea*, *P. Pinaster*, *P. Pinsapo*.

On the Division of the Genus Abies.

The division of this portion of the great family of *Pinus* appears to have been proposed in the observation that some of the members of it had the cones placed vertically on the tree, whilst in others they are pendent. Some other differences in the structure of the cone have been noticed, a recent one,

and the most important, being that in the section to which the name of *Picea* is affixed; the scales are arranged round a spindle, which remains on the tree after the scales have dropped off. As no real distinction in the great family of *Pinus* exists, and properly speaking it in reality forms one whole, as proposed by our great progenitor Linnæus, therefore all divisions of it being merely matters of convenience, it remains to be decided whether the additional section of *Picea* be required or not. Granting fully all the points of difference which have been set forward, and supposing, which is by no means clear, that they are hereafter to be found uniform in the various species which are scattered over the globe, it will then remain to be determined whether the members so distinguished properly form a genus or merely a group. Some limit must unquestionably be put to the crowding our catalogues with useless names of genera, quite as much or even more than species, and it does, on mature consideration, appear that the subdivision of *Abies* will lead to this. There are good and substantial reasons (convenience solely being understood) for the admitting the *Abies* section, which is a well-defined division, as is also the *Larix* or deciduous portion of the family; but it certainly does seem, that by allowing the establishment of this genus we shall open the way to other subdivisions to the hindrance rather than the advance of science, by making demarcations where none exist, and denominating genera what are in fact only groups. Should further and more extended observations, however, make it expedient to adopt this separation, it is to be hoped a better word will be found to designate it than *Picea*, which of course means "pitch," and would lead to the inference that the members composing it were distinguished by affording that substance in greater quantity than the congeners, such conclusion being quite erroneous, and any step leading to such should be avoided in the affixing of terms connected with science.

On the Pinus hispanica.

In describing this remarkable species in the preceding paper, it ought to have been noticed that my observations were entirely made in the Sierra de Segura, in the South of Spain. This magnificent forest, which in 1804 contained 62,000,000

of trees, was traversed by me in its greatest extent, and from it my descriptions are taken and the cones were brought which through the Horticultural Society and other channels have been circulated through England. Those which are now sold and figure under the inappropriate name of *pyrenaica* are from a forest of much less extent in Upper Aragon, at the south foot of the Pyrenees. The reason for not conferring a specific name upon the species of Segura when introduced by me was, that having previously seen the forest of Aragon I believed the species to be formed of the same pine, and having information on which I could rely that those of an extensive district in the Sierra de Cuenca was probably identical with these, and knowing that the species was confined to Spain, the appropriate name of *hispanica* was proposed, in order to prevent the multiplication of names as much as possible, and at the same time give the clearest idea of the arboreal vegetation of the country, which no one had before attempted. The tree then as introduced and described by me is the Pine of Segura; and that known in the catalogues as *P. pyrenaica* is from Aragon, which I believe and have assumed to be identical with it, but do not positively assert that it is so. The points of distinction between this species and its neighbour the *Laricio* as indicated were sufficiently numerous, but two others were omitted: the *P. Laricio* is so resinous that it was used at Toulon for masts; the *P. hispanica* is so dry in its texture as to be quite unfit for that purpose, and could only be used, even in their direful scarcity of native timber, in the arsenals of Cadiz and Carthagena for decks and similar uses which do not require elasticity, and the timber for which is quite of a different quality from that used for masts.

In my original account of the species it was stated, that the cones, after being some time shut up in a box, exhaled a delicious perfume, which quickly evaporated. Whilst writing this paper it occurred that the same quality might distinguish the buds of the species, and on rubbing them I found that the turpentine of the *Laricio* is strong and coarse in flavour, like those of the northern species, its scent remaining long on the fingers, whilst that of the *hispanica* is light, aromatic, and highly volatile. I have no doubt that a fine and peculiar bal-

sam might be prepared from it. Owing to its dryness and to its not bleeding in consequence, the *hispanica* bears the knife better than any of the genus which have come under my observation.

There is no doubt whatever, from the reasons above stated, that for œconomic purposes the *Laricio* is the better tree, though I believe that in hardiness and quickness of growth they are about equal. The French government have, owing to its great value, caused the *Laricio* to be extensively grafted, with *P. sylvestris* (see 'Arb. Brit.'), a process of doubtful utility, certainly so in this country, where, in soil and situations suited to it, it would grow faster than the Scotch fir. As ornamental trees, both, differing totally in character, are equally desirable in the park. There is a very just observation of M. Vilmorin, that the *P. hispanica* has more resemblance to the *Pinaster* than to the *Laricio*. The trees in the Landes I believe, by tapping to extract the turpentine, have a glaucous hue, and in form are not at all unlike the *P. hispanica*; but of course the cones and other peculiarities distinguish them quite as much as from the *Laricios*, and forbid the supposition of any connexion between them.

On Pinus uncinata.

The distinction between this species and *sylvestris* is not great, but in my opinion quite sufficient not only to justify the separation, but in fact make it necessary, it being equally imperative to form good distinctions of genera and species as to reject those which are insufficient. For instance, the *rubra* and *alba*, the *rigensis* and *genevensis*, are merely varieties of *sylvestris*. The first point of distinction is in the cone, and was given by the French botanists who noticed the form of the scales; and from a peculiar hook or knob at the extremity, which is most remarkable when the cone is full formed, before it begins to dry, gave it the name of "*Pin à crochets*." It is really a good designation and has nothing to do with the general form of the cone, which is often curved or bent, as are those of *sylvestris*, *Pinaster*, and many others. Besides this form of the hooks, the cone is more rugged in texture and in form than that of its congener, and they are easily distinguished by those who have studied them in the forest, as well

as the appearance of the foliage, which is more dark in colour, and stronger in the spiculæ, which stand out in a peculiarly rigid form like the spokes of a bottle brush, if such a comparison may be used*. Those which were brought to this country by me were chiefly from the forests of the Spanish Pyrenees, which are still of vast extent, very few trees now existing on the French side.

I have no doubt that the *Mughus* of the catalogues is synonymous with the *uncinata*, and if the species, as there is reason to believe, occurs on Mount Cenis, it is probable that *uncinata* has been applied to the Pyrenean and *Mughus* to the Alpine tree.

P. Pumilio is completely distinct from either *Mughus* or *uncinata*, with both of which it has been confounded. It is described in the French books as being found in the "Marais tourbeux du Jura." I have never seen it in any part of the Jura I have visited, but from the difficulty of establishing it in hard ground it is probably the case, and I have heard that it exists in Hungary. There are two varieties, one red and the other white in the flower, both which may be seen in great beauty at Dropmore. The peculiar habit of the tree is to trail on the ground and extend itself laterally, the branches being curved upwards; the cone is small and something like that of *P. uncinata*.

In assigning the species which have come under my observation in this and in the preceding paper, the cones and fructification are the points principally attended to. I have given the characters as clearly as I could commit them to paper. There are others as to the port and bearing of the trees which can only be fairly judged by much practice and the habit of seeing the trees in their native forests and in masses, where both species and individuals are fully developed.

* It is quite erroneous to suppose that individuals with these characters are to be found in the common woods of *sylvestris*, as any one may satisfy himself by visiting a forest of this species and studying the foliage and form of the trees.

XXXV.—*Supplementary Note to the Synonymy of* Passandra.

By Edward Newman, F.L.S.*

I have just received from Mr. Melly of Liverpool his specimens of the *Passandra*, together with two other highly curious Coleoptera: one of the *Passandræ* and both the others are undescribed, and I therefore hasten to avail myself of that gentleman's kind permission to lay descriptions of them before the public.

Genus Catogenus, *Westwood.*

Sp. 5. Cato. decoratus. *Niger, nitidus; elytrorum fascia lata pone medium, abdomineque subtus ferrugineis: prothorax punctatus disco postice obscure bifosso, lineaque longitudinali utrinque impresso: elytra striata.* (Corp. long. ·275 unc.; lat. ·75 unc.)

Black, shining; the elytra having a broad ferruginous band rather behind the middle, and the abdominal segments beneath being of the same colour: the head is sculptured as in the other species of the genus, having a deep posterior transverse furrow, on each side a longitudinal marginal furrow, two deep oblique frontal impressions, and a somewhat circular impression on the clypeus: the prothorax is deeply punctured, posteriorly it has a somewhat double longitudinal impression composed of deep and confluent punctures; on each side it has an obvious but not deep longitudinal furrow: the elytra are striated, the sutural stria and the 7th on each elytron being the deepest and being united at the apical angle; the 2nd, 3rd, and 4th are distinct, and continue nearly to the apex; the 5th and 6th are abbreviated and terminate in an indistinct series of punctures.

Inhabits the island of Chiloë. A single specimen taken on the west coast of that island is in the cabinet of Mr. Melly.

Genus Omma, *Newman.*

Caput exsertum, porrectum, cum oculis prothorace paullo angustius; oculi rotundi, prominentes, laterales; antennæ submoniliformes, prothorace breviores, 11-articulatæ, articulus 1^{us} cæteris crassior, 2^{us} brevior, 3^{us} longior. Mandibulæ validæ, curvatæ, apice tridentatæ;

* The paper alluded to was published in the second volume of this Journal, page 388.

maxillarum lacinia brevis subacuta, pilosa; galea mihi invisa; maxipalpi 4-articulati; articuli 1—3 subæquales, 4^{us} longior, crassior, apice oblique truncatus; labium angustum, ligula brevi rotundata; labipalpi 3-articulati, articuli 1^{us} 2^{us}que breves, subæquales, 3^{us} longior, crassior, obovatus; clypeus et mentum porrecta, maxillas labiumque tegentia. Prothorax complanatus, subquadratus, postice paullo angustior, angulis anticis rotundatis. Elytra prothorace duplo latiora quintuplo longiora. Pedes mediocres, tarsi 5-articulati; articulus 1^{us} elongatus; ungues simplices.

Sp. 1. Omma Stanleyi. *Totum fuscum, obscurum, lanugine aurea sparsim tectum; omnino verrucosum; elytra seriebus* 10 *punctorum profundorum fere conjunctorum impressa.* (Corp. long. ·85 unc.; lat. ·25 unc.)

Brown without gloss, sparingly covered with a short golden pilosity; all parts of the insect are rugose, resembling shagreen; in size and habit, the form being very depressed, the insect much resembles some of the heteromerous beetles, particularly *Plateia orientalis* of De Haan, (the *Tenebrio complanata* of Dalman,) and it possesses a superficial similarity to the normal *Cucuji*, but from both of these families it is at once distinguished by its very distinctly 5-jointed tarsi, the 1st joint being elongate and all of them fully developed: the structure of the mouth will be found to approach that of the anomalous genus *Rhysodes* of Latreille (the *Clinidium* of Kirby); the similarity is particularly observable in the structure of the maxillæ and in the mentum, which is very broad, porrected, and covering the labium: the tarsi and the lateral and nearly spherical eyes are those of the genus *Cupes* of Fabricius. The prothorax has a deep transverse impression posteriorly. The elytra have five double rows of very deep and nearly contiguous impressions: at the bottom of each impression the elytron is thin and semitransparent: between each pair of rows is a slightly elevated ridge.

Inhabits Australia; a single specimen brought to this country by Lady Parry is in the cabinet of Mr. Melly. The insect will not range with any described family of Coleoptera.

Genus Cupes, *Fabricius.*

Sp. 1. Cupes leucophæus. *Squamosus, leucophæus, fusco variegatus; antennæ compressæ, fuscæ, articulis* 1^{o} 2^{oque} *canis; prothorax*

utrinque dente magno emarginato armatus. (Corp. long. ·7 unc.; lat. ·175 unc.)

The general colour gray; the antennæ stout, much compressed, brown with the exception of the two basal joints, which are gray; the head is gray, the eyes being large, round, distant, lateral, very shining, and of a darker colour than the crown of the head which has four tubercles, two nearly erect and rather acute, each situated about equi-distant from a median line and the margin of the eye; the other two are less prominent, directed forwards and situated between the first pair and the base of the antennæ. The prothorax is of a pale whitish ash-colour, the centre of the disk being darker and having a slender impressed black longitudinal line; the lateral margins are produced into a bifid porrected tooth, the anterior lobe of which is rather acute. The elytra have five ridges, one sutural, two dorsal, one lateral and one marginal: the marginal interstice has a triple row of deeply impressed punctures, the other interstices have a double row: the elytra are ash-coloured, with various brown shades, the ridges nearly white interrupted with dark brown.

Inhabits the Cape of Good Hope; a single specimen is in the cabinet of Mr. Melly.

XXXVI.—*On the Morphology of the Ascidia of Plants.* By M. Ch. Morren, Professor of Botany at Liège, Member of the Royal Academy of Brussels.

Without doubt there are few persons who have not admired, whilst passing through the hot-houses of our horticulturists, the singular structure of the ascidia of *Nepenthes*, *Sarracenia*, *Cephalotus*, *Marcgravia* and *Norantea*. The three first of these genera evidently have lids to their pitchers, which are formed at the expense of the foliaceous organs; but is the nature of these reservoirs of water properly viewed by morphologists? is it well understood? Many authors confine themselves to describing them, and few like Lindley, DeCandolle and Link have hazarded an opinion as to their origin. I have been fortunate enough to meet with two ascidia developed by

a case of monstrosity upon two plants, the leaves of which generally offer no similarity at all; and the examination of these two vegetable monstrosities, which I would rather term simple anomalies, afford me an opportunity of putting forth some new ideas on the formation of the ascidia. In fact, the question is to know whether the ascidia are modifications of the petiole or whether they are derived from the blade of the leaf; whether they are petioles which are become hollow, or whether they are the blades of leaves cohering at their margins in the form of pitchers. Mr. Lindley thinks that they are hollow petioles, although he himself admits, whilst declaring this principle, that the ascidia are fistular bodies occupying the place and performing the functions of leaves.

The pitcher is the true petiole according to him, and the operculum which covers the hollow part is the blade of the leaf in an extraordinary state of transformation. This illustrious English botanist arrives at this idea by the analogy which he finds between the structure of the leaves of *Dionæa muscipula* and those of *Nepenthes* and *Sarracenia*, having found another between the three families, the *Sarraceniæ*, the *Droseraceæ*, and the *Nepentheæ*, to which these plants belong*. In the *Dionæa muscipula* he says, the leaf consists of a broad-winged petiole, articulated with a collapsing blade, the margins of which are pectinate and inflexed. Let us suppose, he continues, the broad-winged petiole to collapse also, and that its margins, when they meet, as they would in consequence of a collapsion, cohere; a fistular body would then be formed just like the pitcher of the *Sarracenia*; and in this case there will be no difficulty in identifying the acknowledged blade of the *Dionæa* with the operculum of *Sarracenia*. From *Sarracenia* the transition to *Nepenthes* would perhaps not be considered improbable†.

We see then that Mr. Lindley views the ascidia of *Nepenthes* and of *Sarracenia* as a deviation of form of a winged petiole, the upper surface of which is become the outer surface of the pitcher; the under surface of the petiolar blade would

* Natural System of Botany, p. 152—155.
† Introduction to Botany, p. 118—119.

be represented by the inner surface of the ascidium. Let us attend to this fact because we shall return to it by and by.

Dr. Lindley, however, with the skill which characterizes all his literary productions, adds, that it would be wrong to suppose that all pitchers are by nature petioles; he even figures *Dischidia Rafflesiana*, the leaves of which are evidently united at their margins to form the singular hollow organs of this plant. In *Marcgravia* and *Norantea* it is no longer the leaves, properly so called, which form the ascidia, but the bracts united likewise by their margins. In this last case it is the blade which constitutes the organ.

There would then be two systems of ascidia, *petiolar*, and lamellar or *limbar*, the latter formed by the cohesion of the margins of the blade, the former by the cohesion of the margins of the wings of a petiole. In none of these cases would it be a petiole hollowed in the interior and rendered fistular, being at the same time open; in like manner as the pedicels and the leaves of the garlics are, remaining closed. M. Alphonse DeCandolle also thinks that it is the petiole which unites together the two margins of its wings to form the ascidium in *Nepenthes* and in *Sarracenia**. This opinion was moreover conformable to the theory of M. DeCandolle, senior, who also regards the lid as the representative of the blade, and the pitcher as a dilatation of the petiole; but adds, that in the present state of the science, it will always be difficult to form a decided opinion with respect to this subject†. M. DeCandolle, senior, however mentions small cups formed at the expense of the tendrils in *Vicia*, and others which arose from the expansion of the medial nerve prolonged beyond the blade of the leaf in cabbages.

That which M. DeCandolle says of the *Vicia* naturally brings back the question to where it was left by Willdenow‡, who connects the pitchers to the ochreæ of *Polygoneæ*, to the spathes, to the ramenta, and to the stipules on one hand, and on the other hand to the aeriferous vesicles of the *Utricularieæ*, to the ligula, the involucra and other analogous organs. But this

* Introduction à l'étude de la botanique, suites à Buffon, t. i. p. 88.
† Organographie, vol. i. p. 320.
‡ Grundriss der Kräuterkunde, § 52. p. 94. (ed. 1802).

author does not explain the genesis or the morphology of these aquiferous organs.

M. Link proposes quite a different system. He first lays down this principle, that the blade of a leaf is never developed after the petiole, but always before (nunquam lamina post petiolum, sed semper ante ipsum explicatur), which I shall take the liberty of denying; for if we observe the development of the leaves with large reniform blades of *Hydrocharis morsus-ranæ*, we shall see precisely the contrary; the petiole is first developed without a trace of blade and sometimes becomes more than a foot long, then at its free extremity it expands at first into two auricles which unite to form an oval; this grows larger and larger to elongate finally into a great kidney-shaped blade. There the subsequent origin of the blade is a thing quite evident. I have also observed it on *Sagittaria sagittifolia*, &c. M. Link however, setting out from this fact as from an incontestable principle, afterwards observes, that in *Nepenthes* the leaves have at first no ascidia which originate subsequently; and he further remarks, that the inferior leaves are without the ascidiferous petiole, which is only present on the upper leaves. He thus takes the lanceolate organ which terminates the lower part of the ascidiferous apparatus of *Nepenthes* for a true leaf, and the pitcher with its cirrhose support appears to him to be an appendix of the inflorescence, which is confirmed in his opinion by what happens in the bracts of *Norantea* (Ascium *). This idea of comparing the pitcher to a floral organ, of reducing its origin to a state of the flower, appears to me a first step towards the correct appreciation of the true nature of the ascidium. This is the state of the discussion between the principal English, French, and Prussian botanists who have treated of organography at the present period. I cannot agree with them, however great influence their authority may have upon my opinions. In the first place, there is a great difference between the ascidium of *Nepenthes* and those of *Sarracenia*. Upon *Nepenthes distillatoria* as upon *N. cristata*, two species which I have before me, the moveable lid is articulated and its system of nervation

* Elementa Philosophiæ Botanicæ, 1837, vol. i. p. 474. § 115.

differs from that of the pitcher. Upon the operculum there is a palmate nervation, on the pitcher a parallel nervation. Let us first examine *Nepenthes distillatoria*: the pitcher has three principal nerves, two in front and one behind, parallel, but diverging at the extremity of the inferior cirrhus; between these nerves there are other smaller ones parallel with these and with each other. The operculum ends at the posterior nerve, and bears two nerves which terminate angularly at its base and then radiate like two fingers of the hand. Now this posterior nerve of the pitcher is the elongation of the ascidiferous cirrhus which is the elongation of the medial nerve of the inferior foliaceous organ. And moreover, upon *Nepenthes cristata*, each of the two front nerves bears a ridge which evidently represents the two margins of a foliaceous blade cohering so as to form a pitcher.

In fact, the pitcher is in my opinion a true blade, and the inferior foliaceous organ is a winged petiole. Let us first recollect that in the phyllodia a compound leaf may unite its leaflets into one body, and that it is not unusual to meet with these halves, quarters, and fifths of these phyllodia, bodies simple at the lower part, leaves compound superiorly, and there bearing a smaller or larger number of leaflets, even from a single leaflet up to a great number. The phyllodia are perpendicular to the direction of the common plane of all the leaflets in a state of waking, and the plane of the phyllodium is in the same direction as the leaflets which are dormant; as if the cohesion having taken place in their youth, the leaflets had the situation of sleeping organs (the sense in which I use this word sleeping (*endormi*) here is known.). But these directions, respectively perpendicular the one to the other, are not indispensable when the leaflets of a compound leaf cohere with one another to form the appearance of a simple leaf. I have before me, at this moment, a *Schinus Molle* raised from seed, in which the young leaves present their leaflets cohering side by side and occupying the same plane as a simple leaf, that is to say, the direction parallel with the horizon. I have in the Museum of Vegetable Anatomy at Liège, a decidedly compound leaf of *Epimedium macranthum*, where there is a similar cohesion of the leaflets, side to side. I suppose now that

all the leaflets of an impari-pinnate leaf cohere with the exception of the odd one, a thing which is very possible; this condition, with a winged petiole, will represent the first morphological phase of *Nepenthes*, where the operculum will be the free leaflet. Mr. Lindley supposed that the wing of *Dionæa* was folded back to cohere, so that the upper had become the outer surface of the pitcher of *Nepenthes*. This appears to me contrary to all analogy. I said above that I possessed two monstrous ascidia. One is on *Vinca rosea*, the other on a *Polygonatum multiflorum*. Now, upon these two ascidia, it is the blade which has cohered and not the petiole which is become hollow, and the cohesion has taken place in such a manner that the under surface of the blade is become the outer of the pitcher and the upper the inner surface. The pitcher of *Polygonatum* resembles that of a *Sarracenia* so closely that it might be easily mistaken for it.

This mode of cohesion and this direction of the folding were all to be foreseen. Wolff, Goethe, DeCandolle, and Turpin have all proved by the unitarian theory of morphology, that for a carpel to be produced, the leaf, the generating element of all the appendicular organs, is not differently circumstanced, that it coheres above and not below; and thence arises that the ovules are produced by the secreting surface of the leaf, the upper surface, while the stomata are on the outside of the ovarium, and while the absorption is carried on by this same outer surface. The same philosophic mode of reasoning has proved the anther also to be the blade of a leaf cohering above and producing (this antherian leaf) by its secreting surface (or surface of production, which is one and the same thing) the pollen, as upon several anthers there are stomata on the under surface, that is to say, on the outer surface of the leaf which produced them.

It is on this account that Link's idea of the ascidium o *Nepenthes* being a floriform organ, appeared to me fruitful in consequences, although they seem as yet to have struck no one.

From the manner of thinking above expressed it will now be perceived that the functions of the ascidia are quite naturally explained, and as simple deductions from a well-established fact. Indeed up to the half of the pitcher it exhibits

its surface inwardly covered with those glands, so well described by M. Meyen in his excellent memoir on the glandular system of vegetables*, glands which, according to the observations of Turner, secrete a liquid, which by ebullition acquires a smell of baked apples and deposits crystals of the super-oxalate of potash †. These glands evidently represent the ovules of the carpels, the pollen of the anther, the nectariform fluid of the ascidimorphous bracts of *Norantea* and of *Marcgravia*, that is to say in one word, the secretions of the upper surface of the leaf, the typical organ. Upon the operculum of the pitcher in *Nepenthes cristata*, on that surface which faces the cavity of the pitcher, there are similar glands. Now this is the upper surface of the leaflet which constitutes the operculum.

The outer surface of the pitcher is then in our opinion the under part of the leaf which has formed the ascidium. We also find upon it the stomata which abound on the corresponding surface of the leaves. Upon *Nepenthes distillatoria* the lower surface of the winged petiole offers the same dull aspect as the outer surface of the urn, and within this, upon a dry specimen, gathered in the Edinburgh Botanic Garden, I perceive in the zone above the glandular region a waxy velvet, of a varying violet colour, like the bloom which covers grapes and plums, globules of wax which hinder the urn from becoming wet within, and which moreover, favouring my system, indicate the existence of a glandular excretion.

In the same manner, upon the ascidium of *Polygonatum* the inner surface was covered with a gum, like the upper surface of the leaves of this plant, and its outer superficies dull like the under surface of the leaves.

Lastly I will add, that upon *Nepenthes cristata* the crests which imitate the two margins of the ascidimorphous leaf are pectinated with flattened and stiff hairs, like the blade of *Dionæa muscipula*.

If we look at the ascidia of *Sarracenia* we see nothing which authorizes us to take them for petioles. Upon *Sarracenia*

* Berlin, 4to, 1837, p. 88. tab. v. fig. 11—27.
† Graham, Botanical Magazine, 2798.

purpurea, *rubra*, *variolaris* and *flava*, which I have particularly examined, there is everywhere a prominent crest which imitates a phyllodium perfectly; it is very decided upon *Sarracenia purpurea* and *variolaris*; then come the *rubra* and the *flava*, where it is least developed. Upon the *variolaris*, at the aperture of the urn, on the side opposite to the opercular lamella, we see that the crest is formed of two cohering blades, which diverge or separate to form the urn. Moreover there is upon the urn, on the side opposite to the crest, a principal nerve which evidently represents the medial nerve of the blade of the leaf; the crest is merely the junction of the margins of the blade, and the urn is the cavity which results from this cohesion. It is here a simple leaf of which the two lateral portions of the blade are conjoint. This seems to me to be so true that the accidental ascidium of *Polygonatum* offered the greatest affinities with the permanent ascidium of *Sarracenia rubra*, only that the crest and the struma were not present, but the opercular lamella presented equally the same form and the same arrangement. This opercular lamella is not articulated as in *Nepenthes*, and does not differ in the system of neuration from the rest of the apparatus; it represents then simply the extremity of the ascidimorphous leaf, the margins of which extremity do not cohere. Upon the accidental ascidium of *Vinca rosea* the operculiform lamella was much larger in proportion to the size of the hollow cavity.

When we examine the origin of the ascidium of *Sarracenia purpurea* we see that it is the crest which first forms and grows quickly; towards its principal nerve there is a cylindrical hollow tube which is subsequently developed into a pitcher. This tube is at first closed by the circinate disposition of its extremity, and in this species two small lateral lamellæ separate to form the opening of the pitcher. These two lamellæ become in the *purpurea* the two lips which serve as an operculum to shut the pitcher like two lateral valves. Their junction, instead of being elongated into an opercular blade as in the other species mentioned, is on the contrary grooved. There is here an organic compensation; the substance of the

lips has carried away that of the blade. Thus *Sarracenia flava* represents the intermediate state; there is a blade and the lips, each half developed. *Sarracenia variolaris* has small lips and a larger blade, and *Sarracenia rubra* has a large blade without any lip. Moreover the same antagonism exists between the struma and the lips; in *Sarracenia purpurea* a struma which occupies but the third of the aperture of the pitcher, and great lips; in *Sarracenia variolaris* a semi-struma and small lips, and in *Sarracenia rubra* a struma almost circular without lips. The *Sarracenia flava* deviates somewhat from this law.

From all these considerations it appears to me, 1st, that since all the ascidimorphous bracts of *Norantea* and of *Marcgravia* are the blades of bracteal leaves joined at their margins so as to form hollow pitchers; 2nd, that since the *Dischidia Rafflesiana* evidently presents leaves with the blade cohering to form an ascidium; 3rd, that since in monstrous states we see blades of leaves become ascidia, and that petioles are not hollowed to produce this form accidentally, and that when they are winged we do not see their wings cohere at their free margins; 4th, that since the structure of *Sarracenia* proves very decidedly that it is a leaf which forms the ascidium, retaining the apex of the blade in its non-coherent state; 5th, that since the ascidia of *Nepenthes* have already at the lower part a winged petiole, and that the crests of their pitcher are traces of foliaceous blades;—it must be allowed that the ascidia have, wherever they have been observed hitherto, a similar organic composition, and that all are metamorphoses of the leaf and particularly of the blade of this organ.

It must be admitted that to give rise to this production nature has folded in the blade of the leaf above, by uniting its margins so that the upper surface of the organ becomes the inner side of the pitcher; that thus there is a great analogy between a carpel and an ascidium, that this is invested with a floral condition, that it has advanced a step further in organization,—but that with all these changes the functions remain the same, because the anatomy of the organs has not been affected, and that thus it was necessary that the ascidium should secrete a fluid in its cavity; as the nectary, another united or

modified leaf, secretes nectar; as the anther, also a united leaf, forms the pollen; as the carpel, also a united leaf, produces ovules: and thus it is that a well-understood law, the unity of organic composition, explains phenomena about which there was only disagreement, uncertainty and error.

XXXVII.—*Floræ Insularum Novæ Zelandiæ Precursor; or a Specimen of the Botany of the Islands of New Zealand.* By Allan Cunningham, Esq.

[Continued from p. 250.]

CORIARIEÆ, *DC.*

1. Coriaria, *Niss., Linn.*

581. *C. sarmentosa. Forst. Prodr. n.*377. *D.C. Prodr.* i. *p.*739. *A. Rich. Fl. Nov. Zel. p.* 364. *Bot. Mag.* 2470.

Tupakihi ab incolis dicitur. *Wine berry shrub* of the Missionaries.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Abundant on the hills around the Bay of Islands, Wangaroa, &c.—1826, *A. Cunningham.* (Middle Island.)—1773, *G. Forster.*

Frutex dumosus, diffusus, procumbens, ramis elongatis, glabris. *Folia* cordato-ovata, acuminata, integerrima, glabra, 5-nervia, breviter petiolata. *Racemus* axillaris, elongatus, pendulus, folio multo longior. *Flores masculi*: numerosi, breviter pedicellati, pedicellis basi bracteatis. *Calyx* 5-fidus, laciniis obtusis. *Petala* nulla, glandulæ 5 segmentis calycis alternæ. *Filamenta staminum* filiformia. *Antheræ* purpuræ 2-loculares. *Flores fœminei*: *Calyx et glandulæ* uti in masculis, etiam absque petalis. *Stamina* 10 effœta. *Ovaria* 5. *Stigmata* 5 patentia. *Carpella* 5, cohærentia (ad maturitatem subdiscreta approximata) monosperma, glandulis grandifactis cincta.

The expressed juice of the fruit of this shrub, which is a berry, is very palateable, and is drunk by the natives or used with their fern root, which, when baked, is soaked in it. The Missionaries also make a wine (*Tuta*) from the fruit, which, in flavour, bears great resemblance to that usually prepared in England from the berries of the elder. As the natives are well aware that a highly poisonous property resides in the seeds, they are careful to strain the juice of them; for if they are eaten in any quantity, violent convulsions and delirium have been brought on, and sometimes even death has been known to ensue. M. DeCandolle tells us, that by eating the fruit of another species (*C. myrtifolia*), several soldiers of the French army in Catalonia were affected, of whom fifteen were stupified and three died.

RUTACEÆ, *Juss.*

1. Melicope, *Forst.*

582. *M. ternata*; foliis oppositis petiolatis trifoliatis, foliolis (biuncialibus) obovato-oblongis obtusis integerrimis subcrenulatisve glabris, racemis erectis subpaniculatis axillaribus petiolo longioribus. *Forst. Prodr. n.* 166. *Char. Gen. t.* 28. *DC. Prodr.* i. *p.* 723. *A. Rich. Fl. Nov. Zel. p.* 293.—Entoganum lævigatum. *Sol. Ms. Gært. Fr.* i. *p.* 331. *t.* 68.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Hills round the Bay of Islands, &c.—1828, *A. Cunningham.*

Arbuscula 12—15 pedalis, ramis teretibus glabris. *Folia*: foliola elliptica v. obovata, obtusa, subintegra. *Cyma* paniculata, axillaris. *Corolla*: *petala* 4 ovata, subacuminata, albida, calyce triplo longiora. *Stamina* 8 corolla minora. *Ovaria* 4, superne mediante stylo connexa. *Stigma* concaviusculum. *Carpella* 4, subcoriacea, venosa, divaricata, superne dehiscentia. *Semina* in loculis solitaria, obovata, atra, valde nitida.

583. *M. simplex*, foliis oppositis simplicibus petiolatis rhombeo-obovatis subrotundisve obtusis bicrenatis glabris, racemis simplicibus axillaribus paucifloris petiolum æquantibus.

New Zealand (Northern Island). Forests near the sources of the Hokianga river.—1826, *A. Cunningham.*

Frutex gracilis, glaber, orgyalis, ramulis elongatis virgatis fascibus teretibus. *Folia* simplicia, opposita, semiuncialia, longe petiolata, pellucido-punctata, petiolis leviter alatis canaliculatis apice articulatis. *Flores* parvi albi, in racemis simplicissimis ad axillas dispositi. *Calyx* brevis 4-partitus persistens. *Petala* 4, ovata, concava, patentia, decidua. *Stamina* 8, quorum 4 breviora, petalis opposita, filamentis basi complanatis. *Antheræ* biloculares. *Ovarium* disco brevi hypogyno 8-lobato impositum. *Stylus* brevissimus. *Stigma* 4-lobatum. *Fructus*: *Carpella* 4, bivalvia, divaricata. *Epicarpium* coriaceum, nervoso-venosum, villosum, ab endocarpio cartilagineo elastico facile solubile. *Semina* in loculis solitaria. *Testa* venosa, brunnea, nitida; *chalaza* prope hilum.

OXALIDEÆ, *DC.*

1. Oxalis, *L.*

* *Foliis palmato-trifoliatis.*

584. *O. Urvillei*, caulibus erectis ramosis, foliis longe petiolatis, foliolis obcordato-bilobis, lobis patentibus calycibusque strigoso-hirtis, paginis viridi cinereis, marginibus subdenticulatis pedunculis elongatis 2—4 floris, petiolis foliis duplo longioribus stylis stamina longiora æquantibus, foliolis calycis ovato-lanceolatis longitudine dimidii corollæ.—O. ambigua. *A. Rich. Fl. Nov. Zel. p.* 296. *non Jacq.*

New Zealand (Northern Island). River Thames.—1827, *D'Urville.* Among fern at the Bay of Islands.—1833, *R. Cunningham.*

585. *O. Cataractæ*; cæspitosa, caulibus ramosis decumbentibus, foliis longe petiolatis, foliolis sessilibus obcordato-lobatis, lobis subdivergentibus, adultis utrinque caulibusve glabris venosis, subtus albido-glaucis, marginibus

revolutis subintegris petiolis (uncialibus) membranaceis, basi dilatatis scariosis semivaginantibus, pedunculis elongatis unifloris, petiolo longioribus, pilis albis conspersis, calycibus (pilosis) corollis fere triplo brevioribus.

New Zealand (Northern Island). On rocks beneath the Great Fall of the Keri-Keri river.—1826, *A. Cunningham.*—1833, *R. Cunningham.*

Flores albi.

586. *O. propinqua*; incano-pilosa, caulibus procumbentibus ramosis, foliis filiformi-petiolatis, foliolis subsessilibus obcordatis venosis, marginibus tenuissime scabris, pedunculis (1½—2 uncialibus) unifloris petiolo longioribus, calycibus villosis, dimidium corollæ subæquantibus, bracteis a calyce remotis.

New Zealand (Northern Island). In bogs at Hokianga.—1833, *R. Cunningham.*

587. *O. exilis*; caule debili ramoso decumbente sulcato, cortice spadiceo membranaceo laxo lævi, foliis longe petiolatis, foliolis brevissime pedicellatis late obcordatis venulosis, marginibus integris, pedunculis, petiolis ramulisque cinereo-pilosis, pedunculis unifloris petiolo brevioribus.

New Zealand (Northern Island). Bay of Islands.—1333, *R. Cunningham.*

588. *O. divergens*, caulibus procumbentibus adscendentibus angulatis ramosis pilis cinereis patulis tenuiter sparsis, foliis petiolatis, foliolis curto-pedicellatis apice dilatatis bilobo-obcordatis, lobis divergentibus rotundatis, subtruncato-retusisve, petiolis, pedunculis, calycibusve cinereo-villosis, pedunculis (medio bibracteatis) unifloris petiolo fere duplo longioribus, sepalis angusto-oblongis obtusis dimidium corollæ æquantibus.

New Zealand (Northern Island). On the sea-shore near Matauri, opposite the Cavallos Isles.—1833, *R. Cunningham.*

589. *O. tenuicaulis*; caulibus procumbentibus tenuissimis, pilis laxis patentibus sparsim instructis foliis tenuissime petiolatis, foliolis late bilobo-obcordatis, membranaceis, venosis integris ciliatis, pedunculis axillaribus unifloris longitudine petiolorum, foliolis calycis linearibus dimidium capsulæ æquantibus.

New Zealand (Northern Island). Among fern, on the shores of the Bay of Islands.—1833, *R. Cunningham.*

590. *O. lacicola*; caulibus erectis angulatis tenuiter parceque pilosis, foliis filiformi-petiolatis, foliolis sessilibus spatiose bilobo-obcordatis integris cinereis, pedunculis axillaribus uni- sæpius bifloris, petiolis plus duplo longioribus, laciniis calycis albo-villosis ovatis obtusis, dimidium corollæ fere æquantibus.

New Zealand (Northern Island). Margins of the lake near Waimaté, Bay of Islands.—1833, *R. Cunningham.*

591. *O. ciliifera*, pilosa, pilis laxis patentibus, caulibus debilibus adscendentibus sulcatis, foliis longe petiolatis, foliolis subsessilibus bilobo-obcordatis integerrimis ciliatis, ciliis patentibus, lobis rotundatis subapproximatis venosis, sinu obtuso, pedunculis unifloris petiolo parum brevioribus, foliolis calycis dimidium corollæ fere æquantibus, siliquisve duplo brevioribus, seminibus obovatis pulchre transversim sulcatis.

New Zealand (Northern Island). Shores of the Bay of Islands, between Waimaté and Keri-Keri.—1833, *R. Cunningham.*

592. *O. crassifolia*; caulibus numerosis (ex eadem radice) latissime cæspitosis, pilis valde raris conspersis, foliis petiolatis, foliolis obcordatis carnosis integerrimis minutissime scrobiculatis utrinque petiolisque cinereopilosis, pedunculis 1-floris axillaribus petiolo subæquantibus, corollæ foliola calycis angustato-oblonga vix superantia.

New Zealand (Northern Island). Shores of the Bay of Islands.—1833, *R. Cunningham.*

GERANIACEÆ, *DC.*

1. Geranium, *L'Hérit.*

593. *G. pilosum. Forst. Prodr. n.* 531. *DC. Prodr.* i. *p.* 642. *A. Rich. Fl. Nov. Zel. p.* 295. *Sweet Geran.* ii. *t.* 119.

Pouhou-Poukou indig. *D'Urville.*

New Zealand (Northern Island). Low moist places in the valley of Wangaroa.—1826, *A. Cunningham.* (Middle Island).—1773, *G. Forster.* Astrolabe Harbour.—1827, *D'Urville.*

Petala obovata, subemarginata, pallide purpurascentia. *DeCand.*

594. *G. retrorsum* (*L'Hérit. Mss.*) foliis quinquepartitis, lobis trifidis sublinearibus, lobulis tridentatis obtusis, pube caulis retrorsum adpressa, petalis obtusis, calyce aristato vix longioribus, carpellis villosis, seminibus reticulatis. *DC. Prodr.* i. *p.* 644.—G. patulum. *Sol. Ms. ex Forst. Prodr. n.* 530. *conf. Endl. in Ann. Wien. Mus.* i. *p.* 182.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Valley of Wangaroa, &c.—1828, *A. Cunningham.*

2. Pelargonium, *L'Hérit.*

595. *P. clandestinum*; caulibus herbaceis erectis, foliis subglabris reniformibus obsolete lobatis denticulato-crenatis, umbellis multifloris capitatis, pedunculis ramulisque pilosiusculis petiolo longioribus, petalis calycis pilosi acuminati longitudine. *L'Hérit. Geran. ined. n.* 29.—P. Acugnaticum. *Du Pet. Thouars, Fl. Acugn. p.* 44. *t.* 18. *DC. Prodr.* i. *p.* 860.

New Zealand (Northern Island). Valley of Wangaroa.—1828, *A. Cunningham.*

Petala cuneata, rubella.

HYPERICINEÆ, *DC.*

1. Hypericum, *L. Chois.*

596. *H. pusillum*, caule debili prostrato tetragono, foliis ovatis obtusis pellucido-punctatis, calyce lanceolato, petalis rectis stigmatibus capitatis. *Chois. Prodr. Hyp. p.* 50. *DC. Prodr.* i. *p.* 549.—Ascyrum humifusum. *Labill. Nov. Holl.* ii. *p.* 33. *t.* 175.

New Zealand (Northern Island). Hills among fern, Keri-Keri river, Bay of Islands.—1826, *A. Cunningham.*

MELIACEÆ, *Juss.*

1. HARTIGIISIA, *Ad. de Juss.*

Calyx 4—5 dentatus, v. partitus. *Petala* 5 basi inter se et cum tubo staminco coalita, valvata. *Filam.* 8—10, in tubum cylindricum 8—10 crenatum, fauce antheriferum coalita. *Antheræ* inclusæ, cum tubi incisuris alternantes, erectæ. *Discus* ovarium vaginans, integer v. crenatus. *Stylus* simplex, staminum longitudine v. subnullus. *Stigma* discoideum. *Capsula* 3—5 locularis, loculis 1—2 spermis, loculicido 3—5 valvis. *Semina* arillata.

597. *H. spectabilis* (melius *Banksii*) foliis impari-pinnatis, foliolis trijugis ovatis obovatisve obtusiusculis integerrimis subundulatis glabris subtus discoloribus, racemis (e ramis vetustioribus) axillaribus paniculatis elongatis pendulis paucifloris, floribus quinquefidis, ovario 3—4 loculari, stigmate breviter pedicellato, caule arboreo. *Ad. Juss. in Mem. Mus.* xxix. *p.* 227.—Trichilia spectabilis. *Forst. Prodr. n.* 188. *DC. Prodr.* i. *p.* 623. *A. Rich. Fl. Nov. Zel. p.* 306.—T. cauliflora. *Sol. Ms. in Bibl. Banks.*

Koa-Koa incolarum.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* A tree 30 to 40 feet high, in damp forests on the banks of rivers, Bay of Islands, &c.—1826, *A. Cunningham.*

SAPINDACEÆ, *Juss.*

DODONÆACEÆ, *Thunb.*

1. ALEDRYON, *Gært. Fr.* i. *p.* 216. *t.* 46.

Calyx 5-phyllus, æstivatione imbricata. *Petala* 0. *Stamina* 8, hypogyna. *Antheræ* incurvatæ, biloculares, filamentorum longitudine. *Stylus* 1. *Stigma* 3-fidum. *Ovarium* 3-loculare. *Bacca* sicca abortu 1-locularis margine aut apice alata. *Semen* exalbuminosum, arillo in completo cinctum, basi loculi adfixum, erectum. *Cotyledones* spiraliter convolutæ, et radicula deorsum spectans.

598. *A. excelsum,* fructu apice ala cristato, foliis alternatim pinnatis sub 4-jugis, foliolis (sesqui 2-uncialibus) ovato-oblongis obtusis acuminatisve supra glabris, subtus parallelo-venosis, ramulisque tomentosis, racemis axillaribus terminalibusve. *DC. Prodr.* i. *p.* 617. *Gært. Fr.* i. *p.* 216. *t.* 46.—Euonymoides excelsa. *Sol. Ms. in Bibl. Banks.*

Tetoki, indig. *R. C.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Shady forests of Wangaroa.—1826, *A. Cunningham.* On the banks of rivers and shores of harbours, frequently within the range of the tide.—1833, *R. Cunningham.*

Formerly an oil was extracted by the natives from the fruit of this tree. Of late years, however, the constant visits of whalers to their ports, have enabled them readily to obtain, by way of barter, abundance of fish oil, which they now prefer to that of vegetable extraction, wherewith to anoint their persons. *R. Cunningham.*

2. DODONÆA, *L.*

599. *D. spathulata*; dioica, foliis oblongo-linearibus subspathulatis basi

sensim in petiolum attenuatis, apice obtuso apiculatis emarginatisve viscidis, sepalis ovatis acutis nudis, fructibus bi-trialatis. *Sm. in Rees Cycl. DC. Prodr.* i. *p.* 616. *A. Rich. Fl. Nov. Zel. p.* 308.—D. viscosa. *Forst. Prodr. n.* 27. *non Linn.*

Heakè, indig. *R. C.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Dry woods, flowering in October, Bay of Islands, &c.—1826, *A. Cunningham.*

BOMBACEÆ, *Kunth.* (s. Malvaceæ.)

1. Hoheria.

Calyx inferus monophyllus, cyathiformis, persistens, æqualiter 5-dentatus, dentibus acutis triangularibus per æstivationem valvatis. *Petala* 5, hypogyna, unguiculata, segmentis calycis alterna subintegra basi unita, æstivatione imbricata. *Stamina* numerosa (20—24) filamentis basi in tubum coalitis et cum basibus petalorum concretis. *Antheræ* reniformes, adnatæ, 1-loculares, longitudinaliter dehiscentes. *Stylus* 1, supra basin 5-partitus. *Stigmata* 5, dilatata, depressa, lobata. *Ovarium* 5-angulare.—Arbuscula *biorgyalis, spectabilis, sempervirens et maxime ornata in sylvis natalibus iis.* Folia *alterna, petiolata, ovata valde acuminata, grosse duplicato-serrata, membranacea, penninervia, venosa, stipulata?* stipulæ *caducæ?* Flores *albi magnitudine.* Pruni, *pedunculati facie.* Philadelphi, *ex axilla foliorum fasciculati umbellative, pedunculis plerumque* 1*-floris, subuncialibus medio articulatis.* Calyx *monosepalus, persistens, corolla dimidio brevior.* Petala, 5, *æqualia, dentibus calycis alternantia, calycem bis superantia, concava, obovata, acuminata, nervosa, extus villosa, pube stellata, intus glabra basi incrassata, pube cinereo instructa.* Stamina *circa* 24 *antherifera æqualia.* Filamenta *ima basi connexa.* Antheræ *peltatæ, uniloculares, medio longitudinaliter dehiscentes.* Ovarium *superum, 5-lobatum, dense villosum, 5-loculare.* Fructus ——.

600. *H. populnea.*

Hoheri ab incolis vulgo vocatur, unde nomen Generis.

New Zealand (Northern Island). A large shrub, of agreeable aspect and very ornamented growth, inhabiting the banks of rivers and skirts of forests, on the shores of the Bay of Islands.—1825, *C. Fraser.*—1833, *R. Cunn.*

A very distinct genus, whose place in the system appears to be in the vicinity of *Tiliaceæ, Malvaceæ,* and *Bombaceæ.* From the first order its monadelphous stamens and unilocular anthers sufficiently remove it, in which particulars, however, it agrees with the two latter, as well as in the valvate æstivation of its calyx, its alternate stipulate leaves (the stipules here being deciduous at an early period) and the stellated pubescence. It may therefore rest where it is here placed, until its fruit, which has not yet been detected in its native country, has been examined, and its structure determined.

[To be continued.]

XXXVIII.—*On a Leather-like Substance found formed upon a Meadow.* By Charles Kersten, Prof. of Chemistry in Freiberg, Saxony, and Prof. Ehrenberg, of Berlin*.

Inclosed I send you an interesting vegetable production, having a deceptive resemblance to white dressed glove-leather, and which was found by M. Lindner on a meadow above the wire-factory at Schwartzenberg in the Erzgebirge.

A green slimy substance grew on the surface of the stagnant waters in the meadow, which, the water being slowly let off, deposited itself on the grass, dried, became quite colourless, and might then be removed in large pieces. The outside of this natural production, as you will observe, resembles soft dressed glove-leather, or fine paper, is shining, smooth to the touch, and of the toughness of common printing-paper†. On the inner side, which was in contact with the water, it has a lively green colour, and one can still distinguish green leaves, which have formed the leather-like pellicle. I dare say a botanist could still determine the *species* to which they belong.

I have made the following experiments on the leather-like substance, having separated it from the green inner coat.

It catches fire very easily, burns with a wax-yellow flame, leaving a pale-red rough light ash. When heated in a small retort dense white fumes are evolved, an odour of burnt paper is perceived, and simultaneously drops of a yellow empyreumatic oil are deposited on the neck of the retort. Somewhat later, water, having a strong acid action, is given off, which evaporates without leaving any residue. A light charcoal remains in the bottom of the retort.

Water, alcohol, æther, nitric acid and aqua regia have no action on it, nothing being dissolved, nor does its texture alter when heated with these re-agents. A solution of hydrate of potassa dissolves it to a brown slimy fluid; caustic ammonia has at first only a slight action, but after some days it swells out, becomes like wet printing paper, and is partially altered.

If the substance is gradually heated with hydrate of potassa,

* We are indebted for this communication, and for a specimen of the substance described, to the kind attention of Prof. Kersten. The original appeared in Poggendorff's 'Annalen,' Part I. 1839.—R. T.

† Unsized paper.—Edit.

and the gas then given off conducted into a solution of nitrate of mercury, there is *no* black precipitate, neither are white fumes observable when the gas is brought into contact with a glass rod dipped in acetic acid: consequently *no ammonia is formed when the substance is burnt*, and, therefore, *it can contain little or no nitrogen*. The ash of itself, or when moistened with sulphuric acid, does not colour the oxidizing flame of the blowpipe. In borax it is dissolved, giving a gloss which while warm is of a deep yellow, when cold of a pale yellow colour. With the double salt phosphate of soda and phosphate of ammonia it gives a pale yellow glass, leaving a thin scale of silica. Fused with soda and saltpetre on a platinum plate the ash gives a deep green mass. It has no alkaline action, does not effervesce with acids, nor does it contain any salt soluble in hot or cold water.

Thus the ash of the substance in question is composed essentially of silica, oxide of manganese and oxide of iron. The substance itself appears to be an aggregation of leaves, from which the green colouring matter, the extractive matter, and also the organic matters have by some organic process entirely disappeared.

I shall endeavour to find out the circumstances under which this complete discoloration of the ligneous matter of the leaves takes place, for this is interesting in a technical point of view.

Postscript by Prof. Ehrenberg.

The very meritorious attention of Prof. Kersten to this leather-like substance has recalled to my mind the subject formerly touched upon p. 119 of my work on Infusoria, but particularly so in relation to the meteoric paper of Courland * that I could not omit submitting it to a microscopic examination. With regard to this meadow-leather of Schwarzenberg, it consists most distinctly of *Conferva capillaris*, *Conferva punctalis* and *Oscillatoria limosa*, forming together a compact felt, bleached by the sun on the upper surface, and including some fallen tree leaves and some blades of grass. Among these confervæ lie scattered a number of siliceous in-

* A translation of Dr. Ehrenberg's notice on the meteoric paper of 1686 was given at p. 185 of the present volume.—Edit.

fusoria, chiefly *Fragilariæ* and *Meridion vernale*. I have observed sixteen different sorts of such siliceous infusoria, belonging to six genera; besides these I have found three sorts of infusoria with membranous shields, and dried specimens of *Anguillula fluviatilis*.

Thus the silica is quite explained, as well as a part of the iron, of which last another part, as also the manganese, may arise from a little dust which lies in irregular particles with the infusoria among the confervæ. I have treated more circumstantially, before the Academy of Sciences, of the meteoric paper of 1686, which I found to be similar to this in composition.

XXXIX.—*Contributions towards a Flora of Van Diemen's Land; from collections sent by* R. W. Lawrence *and* Ronald Gunn, Esqrs., *to* Sir W. J. Hooker. By the Rev. M. J. Berkeley, M.A., F.L.S.

(A sequel to Sir W. J. Hooker's Paper; Journal of Botany, p. 258.)

[With a Plate.]

Fungi.

1. *Lentinus villosus*, Kl. in Linn. Found also in Mauritius.

2. *Favolus pusillus*, Fr., Linn. vol. v. p. 511. tab. xi. fig. 2. *var. pallidus*, Nob. Minute, not $\frac{1}{4}$ an inch broad. Pileus horizontal, reniform, smooth, of a tough fleshy substance, brittle when dry, ochraceous, furnished with a short lateral cylindrical stem of the same colour as the pileus. Hymenium pale. Alveoli at length elongated, flexuous; gills vein-like; their edges pruinose.

On bark. This pretty fungus accords exactly with that brought by Beyrich from Brazil, except in being paler in every part. Montagne refers to the same species *Boletus papulatus*, Bertero, MSS. n. 1680, gathered in Juan Fernandez, May, 1830, but I am inclined to think that it is quite distinct and may therefore bear the name of *Favolus papulatus*, Kl., in Hook. Herb. The alveoli, as Montagne remarks, are rounder; they are besides 4—6-sided, and much more distinct. The whole plant when fresh is apparently white and of a softer texture. In the dry state it is minutely pruinose. It may be thus characterized:—

Gregarious, minute, dirty white, pruinose. Pileus membranaceous, reniform; stem distinct, lateral; alveoli roundish 4—6-sided.

3. *Polyporus* (*Favolus*) *vesparius*, n. s. Pileus 2—$3\frac{1}{2}$ inches across, 1—$1\frac{1}{2}$ broad, $1\frac{1}{2}$ inch high, stemless, subungulate, sometimes imbricated, smooth or slightly scabrous, wood-coloured, slightly zoned towards the margin; flesh browner, corky but soft. Pores very large, $\frac{1}{8}$—$\frac{1}{4}$ of an inch in diameter, 5—6-sided, of the same colour as the pileus.

On bark, Mr. Gunn.

β. corticosus. This variety appears at first sight very distinct, but amongst the specimens sent is one which unites the two forms. The pileus is grey, obliquely ungulate, rugose and cracked, and resembles the bark so much that it would scarcely be discerned did not the hymenium project beyond the margin.

4. *Polyporus* (*Mesopus*) *rudis*, n. s. Stem $\frac{1}{2}$—$2\frac{1}{2}$ inches high, nearly central, rooting into the wood, even, brown, covered with coffee-coloured bloom, shining when rubbed. Pileus $3\frac{1}{2}$—$4\frac{1}{2}$ inches broad, convex, not at all depressed in the centre, orbicular, brown like the stem, and covered with coffee-coloured bloom or very minutely velvety, rugged, wrinkled as if from the contraction of the flesh; margin obtuse. Pores brown, nearly orbicular, middle-sized. Substance light, pale, soft and spongy.

On rotten wood, Mr. Gunn. Its nearest ally is probably *P. rugosus*, which has however extremely minute pores.

5. *P. lucidus*, Fr.

6. *P. frondosus*, Fr. The specimens are not in a good state, but they are apparently referable to this species.

7. *P. sulphureus*, Fr. Mr. Gunn.

8. *P. velutinus*, Fr. Thicker than the usual state, but according with specimens from Mougeot.

9. *P.* (*Ap. Coriacei*) *radiato-rugosus*, n. s. Densely imbricated. Pilei $2\frac{1}{2}$ inches across, horizontal, rather thin, at length smooth, radiato-rugose, dirty white or grey. Flesh white, fibroso-coriaceous, but rather brittle. Tubes longer than the flesh, middle-sized, white within, irregular; orifice often jagged. Resembling some states of *P. versicolor*, but certainly distinct.

10. *P. sanguineus*, Fr.

11. *P. cinnabarrinus*, Fr. Mr. Gunn.

12. *P.* (*Ap. Bienn.*) *lilacino-gilvus*, n. s. Subimbricated, suberoso-coriaceous, horizontal, thin. Pilei 3 inches broad, $1\frac{1}{2}$ inch long, rugged with raised subfibrous lines, more or less zoned towards the margin, reddish grey tinged with lilac especially towards the margin, which is thin and acute; older parts tinged with brown. Hymenium lilac-grey; pores of the same colour within, middle-sized, irregular, very shallow towards the margin, which is without pores. Flesh lilac-grey, spongy, about equal to the length of the tubes.

On charred wood, Mr. Gunn. Allied to *Pol. gilvus.*

13. *P. australis*, Fr. Mr. Gunn.

14. *P. igniarius*, Fr. Besides the more common form there is one frosted with a ferruginous bloom; and a very distinct variety sent by Mr. Lawrence, which occurs also in Mauritius. This may be distinguished as a variety under the name of *P. igniarius var. scaber*. Pileus $3\frac{1}{2}$ inches broad, $2\frac{1}{2}$ inches high, stemless, ungulate, dark brown, here and there tinged with red, cracking in age into coarse scale-like scabrous plates. Hymenium hollowed out or convex; pores minute, round. Heavy; flesh not very hard.

15. *P.* (*Ap. Bienn.*) *rubiginosus*, n. s. Horizontal, hard, stemless, rather thin, zoned, rugose, minutely velvety, especially when young, ferruginous. The older parts acquire a brown tinge, and the margin is occasionally reddish-grey. Substance ferruginous. Hymenium uneven, ferruginous; pores minute, round.

On charred wood. Nearly allied to *Pol. Ribis.*

16. *P.* (*Resup.*) *orbicularis*, n. s. Exactly orbicular, 3 inches in diameter; $\frac{1}{8}$ of an inch thick in the centre, dark brown, margin barren, membranaceous, covered with strigose pubescence. Hymenium confined to the centre, very much cracked when dry; pores shallow, with three or four partitions minute sinuated, orifice toothed, dissepiments very thin.

On living bark, Mr. Gunn. A very remarkable species with the habit of a lichen representing in the resupinate division *Polypori* allied to *P. vulpinus.* On examination of the hymenium under a high magnifier, the pores are found to be stra-

tose, indicating the growth is interrupted, though probably the fungus is annual.

17. *P.* (*Resup.*) *latus*, n. s. Resupinate but with the margin here and there free; 8 inches across, following all the inequalities of the matrix. Above obscurely zoned dingy-brown pruinoso-velvety; flesh of the same colour as the pileus, with a slight ferruginous tinge, suberoso-coriaceous. Hymenium wood-coloured, even; pores round, regular; dissepiments thin.

On branches, Mr. Gunn. A very distinct species, perhaps better placed near *P. sanguineus*, amongst *Api Biennes*. The colour is peculiar, like that of the flocci of *Lycoperdon pyriforme*.

18. *P.* (*Resupinati*) *dædaleoides*, n. s. Altogether resupinate, 3—4 inches across; suborbicular, flesh very thin tan-coloured of a close cottony texture. Hymenium wood-coloured, pores large, rather deep, round, angular, $\frac{1}{30}$th of an inch broad, pale within; dissepiments thin, at length splitting, in consequence of which some portions of the hymenium put on the appearance of a *Dædalea*.

On charred wood. The pores are large, otherwise it might be supposed to be a resupinate state of *P. velutinus*.

19. *Thelephora rubiginosa*, Fr.

20. *Thel. hirsuta*, Fr.

21. *Thel. lobata*, Kze. in Linn.

22. *Exidia Auricula Judæ*, Fr.

23. *Sphæria concentrica*, Bolt.

24. *Mitremyces fuscus*, n. s. Deep brown. Simple or cæspitose. Calyptra hemispherical, pale red-brown within, margin denticulate. Peridium thick, horny, granulato-squamose above, supported below by the anastomosing, subcylindric cartilaginous processes of the stem-like mycelium; teeth 4—6, lined and bordered with bright vermillion, sometimes partially frosted with yellow meal. Internal peridium white. Sporidia forming a solid ball, broadly oval, dirty white.

Epping forest, Van Diemen's Land, in gravelly shady places, Mr. Lawrence. Greatly resembling *Mitremyces lutescens*, but the colour, which reminds us of *Peziza melastoma*; is altogether different, and the peridium thicker and more horny.

Mitremyces coccineus, has the processes of the root coarser and much less distinct; and the sporidia*, instead of being broadly oval, are oblong. I have had no opportunity of examining those of *M. lutescens*. I do not find any flocci amongst the sporidia in *M. fuscus*, but in *M. coccineus* they are abundant. In an authentic specimen of *M. lutescens* before me the inner peridium is inverted as in *Sphærobolus* and hangs out at the orifice. The inner peridium, the upper border of which is scolloped, in an early stage clearly lines the outer, and the void space arises from its ceasing to grow sooner than the outer. The teeth leave within the calyptra a bright vermillion impression. The stem, which must be regarded as a highly developed mycelium, is sometimes obconic, but more frequently there is a large knob of gravel at the base. The mycelium is composed of extremely minute filaments, which are much curled, so that in a fresh state it is probably highly elastic. Plate VII. fig. 1.

25. *Æthalium septicum*, Fr.

26. *Stemonitis fusca*, Roth.

27. *Mylitta australis*, n. s. Globose, $3\frac{1}{2}$ inches in diameter, solid covered with a rugged black bark, beneath which is a white mealy vesiculoso-floccose substance, which traverses the central yellowish nucleus, dividing it into sinuous veins, which consist of a dense mass of extremely minute flexuous filaments, portions of which are swollen and distorted. When dry the veins are extremely hard and horny, and so transparent that the white substance is seen through them. When moistened it becomes rather gelatinous. I can find nothing like sporidia.

This is the species of *Tuber* mentioned by Mr. Backhouse in his account of the esculent plants of Van Diemen's Land, 'Comp. Bot. Mag.' vol. ii. p. 40. It is called native bread, and is said to grow on rotten trees. To the specimen before me one or two root-like extraneous fibres are attached. I have no doubt that it is congeneric with *Mylitta Pseudacaciæ*, as it agrees with the description of that species in everything

* The sporidia of *M. coccineus* are minutely wrinkled in the direction of their larger axis as those of *Ascobolus furfuraceus*. Possibly this may be the case in less advanced individuals of *M. fuscus*.

except size and colour. The structure is very different from that of *Pachyma Cocos*, Schwein, Plate VII. fig. 2.

ALGÆ.

1. *Scytonema arenarium*, n. s. Forming a thin uniform yellow brown stratum for some inches over sand, which it binds together by means of numerous transparent colourless rooting filaments. Threads obtuse, flexuous, here and there slightly branched at the base, and rooting; border thick transparent gelatinous; sporangia obscure, seldom visible, occupying only about a half of the central tube. Plate VII. fig. 3.

The specimens described above are in the rich collection of Sir W. J. Hooker, who has kindly lent me all the fungi he possesses. Out of the twenty-seven species sent by Messrs. Lawrence and Gunn it will be observed that twelve are common European fungi. Amongst them is a specimen of *Parmelia parietina* on an apple twig, on which perhaps it had been introduced from England.

REFERENCES TO PLATE VII.

Fig. 1. *Mitremyces fuscus*, with its calyptra; one of the individuals is cut open to show the inner peridium; *a*. sporidia; *b*. a horizontal section of one of the processes of the mycelium very highly magnified; *c*. sporidia and flocci of *M. coccineus*.

Fig. 2. Flocci of *Mylitta australis* from the transparent veins, very highly magnified.

Fig. 3. *Scytonema arenarium*; *a*. filaments and rootlets; *b*. a filament more highly magnified; *c*. a portion of a filament with sporangia.

XL.—*Information respecting Botanical Travellers.*

Mr. Gardner's Journeys in Brazil.

Villa do Crato, Sertão of the Province of Ceará,
December 5, 1838.

WHEN I had the pleasure of writing to you from the Villa do Icó I expressed myself doubtful as to the success which might attend my visit to this neighbourhood. After a residence, however, of nearly three months in this town, I am happy to inform you that my fears have been agreeably disappointed, and before proceeding to give an account of the nature of the country or its vegetation, I hasten to inform you that yesterday I despatched six cases of plants for Eng-

land. Four of these contain a collection of dried specimens, amounting to 470 species, for you; and the two others are filled with living *Orchideæ*, &c., for Mr. Murray. The boxes are to travel from this place to Icó, a distance of 100 miles, on horseback; and from thence they will be forwarded in an ox-waggon to Aracáty, through the kindness of a Portuguese friend, to whose care I have addressed them. Mr. Miller, the only Englishman in Aracáty, has promised to send them by a vessel to England, if there be one in the river bound for London or Liverpool when they arrive; if not, and if none is shortly expected, they will be transmitted to the city of Ceará, whence there is oftener a direct intercourse with my native island. I have been obliged to let these plants go *en masse*, and only arranged according to their natural orders, my chief reason for doing so being the great run that the subdivision of such a collection would cause upon my stock of paper, to recruit which will be impracticable till I again reach the coast; where, if all is well, I do not expect to arrive for at least twelve months. At one time I had some thoughts of despatching this collection to Pernambuco, there to remain till my return from Pará, but as it includes a larger number of new species than any that I have previously sent, and as I am aware that you are always anxious to obtain undescribed plants as quickly as possible, I have decided on forwarding it immediately to Glasgow. Well knowing the great labour and loss of time that the distribution of the late Mr. Drummond's plants cost you, I cannot ask you to undertake the like task for me; but as the species are already in a state fit to be sent away, I think it is possible you may be able, from time to time, to get some of them forwarded to their respective destinations. If so, when you choose your own set, be so kind as to select one for me also; observing that where there is only one specimen of a species, such single plant belongs to your own set; if two, then the best is for you and the other for myself. As however there are more specimens than enough for my subscribers of many kinds, I will thank you to reserve the surplus for me, after having liberally supplied your own herbarium; for on my return to England such duplicates may be very useful for effecting exchanges with the plants of other countries.

In two of the boxes you will find a few packets of seeds, which you will be so kind as to send to Mr. Murray; also a small parcel of the wax produced by the Carrahuba palm (*Corypha cerifera*, Mart.), which grows abundantly in the plains between Aracáty and Icó, and of which Dr. Christison, of Edinburgh, may perhaps like to have a portion. Some shells, addressed to my own name, may be handed

to my father. There is also a collection of mosses, gathered in this neighbourhood: the species are few in number, as the country is low, but among them I think you will find a new *Bryum*, allied to *B. roseum*, and an undescribed *Hookeria*, which seems to approach your *H. pallescens*. Along with these articles I have sent a short memoir, which I lately drew up, on the establishment of the genus *Mouriria*, Juss., as the type of a new natural order, with a few observations on one or two other genera. If you deem this paper worth publishing in the Magazine it is very much at your service; if not, be kind enough to lay it aside for me, as I have not kept a copy.

The collection now sent differs very materially from that which I transmitted from the Organ mountains, in its paucity of *Orchideæ* and Ferns. If, however, it affords you the same pleasure in examining the plants that I derived from collecting them, it will not be small; a pleasure heightened to me by anticipating your gratification. I will thank you to ascertain whether the beautiful leguminous shrub which I have named in honour of my excellent friend J. E. Bowman, Esq., does not belong, as I suspect, to a new genus. Some observations on the structure of the flower accompany my paper on the genus *Mouriria*, and I am anxious that the facts should be ascertained before Mr. Murray distributes the seeds, of which I have sent him an abundant supply. I may also mention that the composite plant (No. 1732), which I took to be a new genus when arranging the collection, I have since found to be an undescribed species of *Ichthyothere*, Mart. (*vide* DeCand. Prodr. vol. v. p. 504.)

Having told you thus much respecting the collections, I proceed to give you some account of my journey from Icó hither, and of my residence here. Having purchased two horses more than I had brought with me from Aracáty, I started from Icó at half-past seven in the morning of the 4th of September, and after a journey of six days arrived here. The distance is 30 leagues, or somewhat more than 100 miles, and the country through which I passed differs remarkably from that which lies between Aracáty and Icó, both in the nature of its surface and its vegetation. The former is of a hilly undulating character, exhibiting none of those large plains which are seen further down, but on the contrary it is all wooded with small trees and shrubs, nearly the whole of which are deciduous. As it was the beginning of the dry season when I started from Icó on my way hither, there was scarcely a leaf to be seen; a circumstance which, to a botanist particularly, makes a journey in such a country very monotonous and uninteresting. The most abundant tree is that which is called by the natives *Arocira* (*Schinus Arocira*, of St. Hi-

laire); it flowers before the foliage appears, and in this state much resembles the alder of Europe when loaded with its catkins. Its mode of growth is upright, and it attains a height of 30 or 40 feet. Large *Ingas* or *Mimosas*, and the *Triplaris Americana* are also common; of the latter the female plant when in flower is recognizable at a great distance, as well as the *Chrysobalanus*, that I formerly mentioned as abounding below Icó, and which also grows in plenty here. In passing along the eye is sometimes relieved from the flowerless monotony of the woods by seeing here and there a solitary purple or yellow *Bignonia*, or an azure-blossomed *Jacaranda*, destitute of foliage, but rearing its therefore more conspicuous and magnificent diadem of flowers above the other denizens of the wood; or an occasional plant of *Cochlospermum serratifolium*, loaded also with its large and beautiful yellow bloom, attracts the attention of the traveller. On dry hilly places there are abundance of small shrubs. The only ones, however, that I recognized were two or three species of *Lantana* and *Krameria Ixina*. Within a day's journey of Crato I collected the only orchideous plant that I have seen since quitting the coast, a new *Oncidium*, which I have called *O. urophyllum*. The natives of the Sertão call it *Rabo de Tat'u* (armadillo's tail). It grows in great plenty on the soft bark of a species of *Geoffroya*.

It was not until I came within a few leagues of Crato that the country became more verdant, and large tracts of land planted with cane gave the assurance that I was approaching a place better suited to my pursuits than any that I had seen since my arrival in the Sertão. It is impossible to express to you my delight on entering into this comparatively rich and smiling district, after a ride of more than 300 miles through one which is little better at this season of the year than a desert. The evening on which I approached this town was one of the most beautiful I ever remember to have seen. The sun was setting in great splendour behind the Serra de Araripe, a long range of hills about a league to the westward of the villa, but the freshness of the country deprived his rays of that burning heat which shortly before sunset is so oppressive to the traveller further down. The beauty of the night, the cool and reviving feeling of the atmosphere, and the richness of the landscape, so different from what I had lately seen, all tended to produce a buoyancy of spirit such as only the lover of nature can experience, and which I vainly wished might prove enduring, as I felt not only at ease with myself, but "at peace with all the world."

During the journey I had added but little to my stock of specimens. The most remarkable of them is a small *Jungermannia*-look-

ing plant, which I found on the first day, growing on rocks, stones, and among gravel in the bed of the Rio Salgado, about 5 leagues from Icó. As it was in seed, the flowers having all passed away, I could not positively ascertain the genus, but I suspect it to belong to *Mniopsis*, Mart., at all events to the natural order *Podostemaceæ*. From Icó I brought several letters of recommendation to this place; but before I left the former town, one of my fellow-travellers from Pernambuco having written to a friend here that I was about to visit his neighbourhood, I found that an empty house had been obligingly procured for my reception.

Crato is a small and sufficiently miserable town, situated in the hollow part of a large valley, several leagues in extent, and bounded by the Serra de Araripe on the south and west. In case you should consult a map of Brazil to find the place where I now am, I may mention that the one which I possess, and which I believe to be the last published, is very incorrect as regards the situations of the towns in this province: for instance, Icó is placed where the Serras de Mangabeira ought to be, and *vice versâ*, and the distance between them ought to be 10 leagues. Crato, instead of being 10 leagues to the S.W. of Icó, is 30, thus bringing it exactly to the Serra de Araripe, its proper position; and Barra de Jardim (not Bomjardin) is 16 leagues to the south of Crato. Sugar cane, mandiocea, rice and tobacco are the principal articles of culture in the vicinity of Crato. From the juice of the cane a kind of sugar is prepared called *rapa dura*, and made into hard cakes about the size of half bricks. This substance is used all over the Sertão as a substitute for sugar, and forms the great article of commerce between Crato and Icó. Almost all the fruits which are sold in the towns near the coast are obtainable here: such as the orange, lime, lemon, mango, papau, banana, plantain, grape, pine-apple, melon, and water-melons. The first of these are vended at about 1*d*. the dozen, pine-apples double that price, and I purchased to-day a remarkably fine-flavoured melon, as big as my head, for about 2*d*. of our money. There are a few small plantations of cocoa-nuts, which appear to thrive well and bear abundantly, and in the woods are great numbers of cashew trees, but their fruit (or rather the thickened peduncle, which is the esculent part) is small, not bigger than a cherry: probably it is a different species, of which you may judge, as I send you a specimen in flower and leaf, and to Mr. Murray a few of its seeds. In the Catingas, or deciduous forests, a fruit abounds called *mangaba*, of which you received specimens from Pernambuco; it belongs to the *Apocyneæ*, and the flavour is, in my opinion, very superior to that of any native fruit that I have

tasted. *Araca* and *Grava* are also common. Another fruit is also much spoken of, the *marangaba*, but it is not yet ripe; the tree which produces it is a new species of *Psidium*, to which I have given the name of *P. nanum*, as the shrub does not rise a foot high. It grows plentifully on the top of the Serra de Araripe. The neighbouring woods produce a fruit belonging to a new species of *Mouriria*, the berry of which is black, and about as big as a middle-sized gooseberry. In appearance and taste it much resembles the fruit of *Eugenia cauliflora*, DC. (the *Jaboticaba* of the south of Brazil). This is called by the natives *Pusd*, a name which I have retained as its specific appellation, as I am an advocate for the retention of native names to new plants.

The great cause to which the fertility of this part of the Sertão may be attributed exists in the numerous springs which rise from the base of the Serra de Araripe, and which are again divaricated in a thousand directions for the purpose of irrigation. At present but little land is cultivated in comparison with what would amply repay such labour; the vicinity being but thinly populated and the habits of the natives very indolent. With very little trouble they raise as much as will support life, and seem to care for nothing else. Their dress is of the simplest kind, and not expensive. When, however, the population becomes more numerous, and civilization shall have multiplied their wants, this district will assuredly prove a rich and valuable part of the province.

During my residence here I have made many excursions, but the Serra de Araripe has afforded my best field. I have spent several days in exploring its ravines, sides and summit, every trip yielding me large supplies of new and rare plants, as the collections now sent home will abundantly testify. The greater proportion of the wooded districts around Crato consists of deciduous trees and shrubs, here called *Catingas*; but in low moist localities, and along the base of the Serra, a great many of the trees are evergreen. As I am aware that you feel particularly interested in knowing what are the large trees of the countries which I visit, I shall now give a list of such as are most abundant or remarkable in this vicinity. One of the commonest denizens of the Catingas is *Moghania glabrata*, St. Hilaire, and it is the only truly gregarious exogenous tree that I have met with in Brazil, covering large tracts for miles, to the exclusion of almost everything else. In general it is a tree of 30 or 40 feet high; but old individuals often attain a much greater stature. Like many of the other inhabitants of the Catingas, its flowers appear before the leaves. The blossoms are produced in large panicles, they are of a greenish-

yellow colour, and very sweet-scented. The natives of the Sertão call this tree *Tingí* and apply it to many useful purposes. An infusion of the bark of the root is employed to poison fish, and that of the stem to cure old ulcers, while an excellent soup is afforded by the large cotyledons of the seeds. Another tree, which grows in the same situations, is a species of *Caryocar*, and makes a fine appearance when covered with its large racemes of yellow flowers. The fruit, which is not yet ripe, is said to be excellent when cooked, and the hard wood is used in mill-work. This tree is called *Pikí* by the natives of the Sertão. Two large ingas are also common in the woods, and I have sent specimens of both; one is called *Timbahuba* and the other *Visgéira*. The former is the smaller; the *Visgéira* presents a most remarkable appearance when its flowers expand, these being of a dark purple colour, and suspended on a peduncle a foot in length. The *Jatoba* is another large tree, which I have not yet seen in flower, but suspect it to be a species of *Hymenæa*. The cashew also reaches a considerable height in this neighbourhood, and grows more upright than the variety from the coast. There is also the *Angelina*, a beautiful and large species of *Andira*; good specimens of it in flower are in this collection; and some of the fruits, which I am at present drying, shall follow by the next opportunity. There are also two large *Bignonias* growing here, one with purple and the other with yellow flowers; but owing to the durability and hardness of their wood, which is much sought for by workers in mill- and cart-work, they are not allowed to attain any great size near the town of Crato. Besides these which I have enumerated, there are many others, but, though of considerable size, they can hardly be called large trees. Among them I may mention the *Pao de Jungada* (*Apeiba Tibourbow*, Aubl.), as of frequent occurrence, and conspicuous from its large prickly capsules. Its wood affords the material of the raft-boats, called *jungadas*, so much used on the coast. A species of *Byrsonima*, very lovely when in blossom, and another of *Callisthene*, also remarkably beautiful, grow here; the latter, being distinct from the three species described by Martius, I believe to be new, and in allusion to its great masses of charming yellow flowers, I have called it *C. floribunda*.

I have now examined the stamens of species belonging to four different genera of the tribe *Vochysiaceæ*, and find them all, as Martius describes them, 4-celled.

Many other trees of course exist in this vicinity, but the want of flowers prevents my determining them. On the Serra de Araripe are several species that do not occur in the plains below. This

Serra, which does not rise above 1500 feet higher than the level of the town, is the commencement of a large table-land (*tabuleira*), stretching far to the south and west, and on which the cashew, *Piké*, and *Mangaba* grow very abundantly, as well as a kind of *Gomphia*, that rises to a height of 20 or 30 feet. Under the shade of these may be found several herbaceous plants and humble shrubs. Of the latter, the small *Psidium* (*Mangaraba*) already mentioned, is the most common. On the sloping ascent an extremely beautiful *Vochysia* and a *Qualea* abound, as well as a new arborescent species of *Albertinia*, that grows 25 or 30 feet high. Of palms, only three species are found here; the carnahuba (*Corypha cerifera*, Mart.), so common below Icó, and which still straggles up to within two days' journey of this place, not being among them. The largest of these three palms is a very beautiful tree, probably an *Attalea*, but I have not seen its inflorescence. It rivals the cocoa-nut tree in height of stem, and far excels it in the size of its head of fronds. The fronds are thrown up almost vertically, and their great length and deep green colour give the tree a most magnificent appearance; while the fruit is about the size of an apple, 3-celled, and borne in large racemes. I send Mr. Murray a few of them, with directions to let you have one. The second species is the *Acrocomia sclerocarpa* of Martius, very striking from its fusiform prickly stem. The third of the palms, much smaller than the two others, is only remarkable from its being the sole kind of tree on which the solitary epiphyte that this neighbourhood produces will grow. The first-mentioned species is called *Palmeira* by the natives, the second *Macahuba*, and the third *Catolé*.

Cacteæ are very scarce here: I have only met with four species, all of them similar to those that I had already despatched to England from the Rio San Francisco. *Orchideæ* are still more rare. Two kinds only can I find to send home alive, but of both you will receive an abundant supply: they are the *Oncidium* already mentioned, and the Epiphyte that grows on the *Catolé*. The latter I have not seen in flower, it being in a dormant leafless state at this season; the general appearance is that of a *Catasetum*, and I have no doubt it will prove to be new. Here the Epiphytal *Orchideæ* of South Brazil are represented by *Loranthaceæ*, which, in the shape of *Viscum*, exist on almost every tree, and being evergreen give a remarkable appearance to the deciduous forests. Of this tribe you will find a rich variety in the present collection. Ferns are rare, but I have added to my previous stores a few from the Serra de Araripe; one of them being that beautiful tree-fern *Cyathea aculeata*. In a few

days I go to Barra de Jardim, 16 leagues to the south, where I mean to spend three or four weeks, according as I find it to be a good or bad botanizing ground. Thence I return to this place, in order to await the setting in of the rainy season, when it is my intention to proceed to the city of Oeiras, 400 miles to the west, the capital of Piauhy. Since my arrival here I have gained better information respecting the road, which is said to be utterly impracticable at this season, for want of grass and water for the horses. But this will make little difference to me on my arrival there, as I shall have to remain in Oeiras till the end of May, when the rains cease. On my return from Barra de Jardim I will again make a few more excursions in this neighbourhood, and before starting will send you what I may have collected :—perhaps about the end of January. At Barra de Jardim there is a large deposit of fossil fish, and it is probable I shall send a box of them also. It is still my plan to make my way to Pará via, the Rio Tocantius; but on this subject I shall write to you more fully from Oeiras, where I expect to obtain fuller information respecting the route.

Since coming here I have enjoyed excellent health, except for eight days, during which I was confined to the house from a slight attack of ophthalmia, a very common malady in this neighbourhood. I have been visited by many persons suffering from the disease in a chronic state, and have gained no little reputation from having either cured or much alleviated the symptoms in all those whom I treated, even when the complaint has been of long standing. The people among whom I am now thrown are far from being a good set. They are remarkably revengeful, and their frequent quarrels are commonly settled by the treacherous use of the long sharp knife (*faca de ponta*), which every one carries at his side. My servant, my man Friday as I call him, a negro of very superior character and abilities, had a narrow escape the other day; for having involved himself, I know not how, in a dispute with a fellow who was in a house whither he had gone for the inoffensive purpose of getting his hair cut, his opponent drew his knife and attempted to stab him. My servant fortunately caught the blade in the hand which he had raised to ward off the blow, by which he prevented his body from being struck, but nearly lost two of his fingers. The assassin fled, leaving his weapon behind him, and has not since been heard of. For my own part I find it necessary to be very cautious as to what I say or do among them. They scarcely know what to make of me, or to imagine to what purpose I intend to apply the "many leaves," as they call them, which I am collecting. Those "who still would seem the wisest,"

aver that they are to serve as patterns for printed cottons; an opinion worthy of a native of my "auld toon of Glasgow."

By the boxes I wrote you a few lines, but I expect this letter will reach you first, as I forward it to Pernambuco by a person whom I am sending thither to bring me my letters or anything that may be lying there for me, as I begin to feel anxious about my friends, from whom I have had no news for nine whole months. It will take him more than a month to go and return, but he will still be back before I start for Piauhy.

I had great difficulty in obtaining wood wherewith to make the boxes which I have just despatched, and as to any help in the way of making them, it was needful, after I had bought up at great expense all the old boxes in the town, to put them together with my own hands, which are now so blistered with the use of the hammer and saw that I can hardly hold my pen. Necessity has no law; from cooking downwards I have to do almost everything. Insects are very rare here. I had collected a few dozens and laid them on the house-top at night to dry in a sheet of paper, as the weather had been damp; but in the morning I had the mortification to find them all gone except some of the legs and wings, which vexed me the more as many of them were new. I shall recommence collecting immediately.

BIBLIOGRAPHICAL NOTICES.

De Pinubus Taurico-Caucasicis. Auctore Steven*.

In a preceding paper the propriety of considering the Caucasian pines as a separate group was suggested, under the idea that they would be found to differ from those of Europe, and that united with those of Northern Asia they might prove to be of sufficient importance to require a separate classification in the pinology of the globe. These views have been completely confirmed by the work we are about to examine, and at a much more recent period than we had ventured to anticipate. We are indebted to M. Steven for bringing together at one view the results not only of his own researches, but those of Nordmann, Wittman, Sovitz and others; a course which cannot be too much commended from its superiority to the usual practice in this sort of publication of giving the isolated discoveries or observations of the writer, whilst those of others are carefully withheld from notice.

* For this review we are indebted to the kindness of Capt. S. E. Cook, R.N.—Edit.

The original work appears to have been published by the Imperial Society of Natural History at Moscow, we rather believe since the death of the author, which has taken place recently. Not having seen the paper itself, we have made use of the copy which is given in the 'Annales des Sciences Naturelles' of January 1839.

M. Steven is of opinion that the *Pinus* should be preserved entire as proposed by Linnæus, and accordingly calls all the species *Pinus*. Having mentioned this subject in the preceding paper we have nothing to add at present; but we must observe that, agreeing perfectly with M. Steven in his principal position, we think he is unnecessarily and most inconveniently tenacious about species, as we shall see in the examination of his work.

The first species described is a variety of *A. pectinata*, or silver fir, which differs from it in having the branchlets smooth which in the congener are pubescent, and the name of *leioclada* is proposed to be affixed to it. Tournefort, who noticed it near Trapezas, considered it to be absolutely identical with the common species of the Alps and Pyrenees. It was found on the higher range of the Caucasus by the author of the 'Flora Caucasica,' though he has not given the locality, and branches were sent by Sovitz, which he had gathered on the range of Adshar, above Guriel, where it was also seen by Nordmann. Although it cannot be positively asserted, the inference may be drawn, that its place is below that of the following species.

No. 2. *Abies Nordmanni* is a new silver fir, which was discovered in 1836 on the range of the Adshar, at an elevation of 6000 feet, by M. Nordmann, whose name has been most justly conferred upon it. It was also seen by Wittman on the southern slope of the range between Cartalinia and Achalziche, near Azchur, as high as the alpine region, where it was mixed with the *A. orientalis*. It attains the height of 80 feet in the stem, and is above 3 feet in diameter. Cones are produced in from fourteen to sixteen years, at first near the summit, from which they descend in the adult tree, covering the branches to within a fourth part of their height, growing upright, single, binary and ternary, and exuding quantities of resin. The seed ripens at the end of September, when the cone immediately falls to pieces, leaving the spindle or axis, which sometimes remains for the whole year. The wood is harder than that of *P. orientalis*, and is not so liable to be attacked by the larvæ of insects as that species.

From the description of this most noble tree it would appear to be connected with *A. Pichta*, or the silver fir of the north of Asia. The

altitude at which it was discovered proves it to be very hardy, and the early period at which the seed ripens, which I noticed and described as a peculiarity of the *P. uncinata* in my original description of that tree, I consider to indicate the same quality. We must for these reasons, as well as the size the tree attains and the quality of its timber, assign it the very first rank in the family, and its introduction to our parks and forests, both for ornament and utility, is most desirable.

No. 3 appears to be a variety of spruce, to which the inappropriate name of *P. orientalis* has been given; why not *caucasica*? The author first noticed it in the loftiest mountains of Imeritia, and Nordmann has since observed it in Upper Mingrelia, and forming whole forests between Guriel and the Adshar mountains.

The foliage is shorter by one half than that of the common spruce, and the spiculæ are quadrangular like those of that species; sharp, but not prickly; not binary as Tournefort asserts, but grow singly as in the common spruce.

It is a lofty, and, from the elevated sites at which it was observed, is no doubt a hardy and desirable tree, but from the observation of the timber, compared with that of *A. Nordmanni*, must be considered as less valuable than that magnificent species. Neither the *Pinus Abies* (Lin.) nor any species of larch have yet been discovered in the Caucasus.

PINUS.

1. Is the *P. maritima* of Lambert, one of the varieties of *P. halepensis*, and that which I consider to be the more hardy of the three; it grows on the shores of Abshasia, near Pezundan, the ancient Pithyus.

2. "*P. Laricio* constitutes forests on the western summits of Tauria, descending even to the shores, but never passing to the northern declivities. The author also has specimens from Gelindshik, a port on the eastern shore of the Black Sea, 100 leagues distant from the mouths of the Hypanis."

We cannot say that the observations on this species are at all satisfactory. *P. Pallasiana*, or *taurica* of our catalogues, would seem to be considered as identical with *P. Pinaster*, and with the species we have under the name of *P. Laricio*. Such however appears to be the meaning of the text, and as he considers that *P. austriaca* is another synonym, we shall have *Laricio, Pinaster, P. taurica* and *austriaca* as one species, a position which is not only inadmissible, but so extraordinary as only to be accounted for by the want of opportunities for studying the respective species.

If we admit any portion of the forests he describes to be composed of the true *Laricio* it leads to an important observation on the habitat of the species. Between Tauria and Corsica there is a difference of three to four degrees of latitude, which is a considerable space, but is increased exceedingly by the relative climate of the two seas. Accordingly, whilst the tree is placed in Corsica at an elevation of 2000 to 3000 feet, it descends to the shore of the Black Sea, and whilst it resists the milder climate of the western slopes of Tauria it is unable to face the Boreal blasts of the steppe which assail the northern face of the chain.

There is no mention made of *P. taurica*, and it seems clear that the tree mentioned inhabiting Tauria as *Laricio*, is that species which the author considers synonymous, but which are quite distinct. The question is, are there two, or are we to consider that the *P. taurica* is that which takes the place above the *halepensis* in Caucasus? It is very probable that both species exist and that the Caucasian may be the true *Laricio*, the Taurian being our *taurica* or *Pallasiana*. In case there be only one species, it takes the middle rank in this region and represents the *Laricio* and *P. hispanica* of the south of Europe, being a little hardier than those species. I have little doubt that this is the true state of the case, and it must be repeated that it is next to impossible to decide a species of *Pinus* from specimens of branches in herbals, on which testimony part of this report seems to be founded.

P. sylvestris. We have a description of two or three species under this head, owing to the habit of the writer of generalizing, and his reluctance in admitting species: that which he mentions as being found, though rarely, on the highest summits of Tauria, the elevation of which range is barely within its natural zone, whilst it forms entire forests on the central Caucasus, appears to be our *uncinata* of the Pyrenees. That mentioned as inhabiting the subalpine regions of the Terek, which is also the *P. sibirica* of Ledebour, must be referred to the same species, thus confirming our view in placing it above the common *P. sylvestris*. The differences he mentions in the foliage constantly occur in these trees, and are not sufficient either to cause the removal from one, or the constituting another species upon them, the only real difference being in the cones.

A variety called by him *hamata*, but which he considers a *P. sylvestris*, appears by the description to be quite distinct from that species. It has the cones three inches long, and was found by Wittman in Lasisthan, and by Nordmann in the subalpine regions of Mount Adshar.

Another most curious variety belonging to the same group is given under the name of *argentea*. It is described as having the cones, and foliage of a splendid silvery hue. A single tree was found by Wittman near the village of Artamin, two days journey from Batum in Lasisthania. So remarkable is the account of this tree, that had it depended on the single specimen, we should have been inclined to assign its appearance to some accidental circumstance, but Nordmann also saw trees corresponding in colour on the Adshar range.

We are not informed if the whole range of the Caucasus has been examined, and neither the absolute or relative elevations at which the species are found are perfectly given in this work. The difficulty of forming a correct judgement on these points as well as that ascertaining the exact extent of the ranges mentioned is increased by the want of good maps. From the correctness with which the species are described, however, and the care which has been taken to place them before the reader, an approximation may be made to the attainment of this object. In commencing by the southern coast of the Black Sea, and following the ascending series, we have successively *P. halepensis*, *P. Laricio* (Auctorum), *Abies leioclada* (var. of Common Silver Fir), *A. Nordmanni*, *A. orientalis*, *P. uncinata* and varieties. This arrangement corresponds very nearly with that of the Pyrenees, the upper zone being formed of the hardier species of the group of *P. sylvestris*, with which are mixed the *A. orientalis* and *A. Nordmanni*, which attains a very high elevation, and is succeeded by *A. leioclada*, *P. Laricio*, and *P. halepensis*, that of the Pyrenees in running a line across Catalonia being *P. uncinata* and *sylvestris*, *A. pectinata*, *P. hispanica*, *P. Pinaster*, and *P. halepensis*. The chief difference is in the existence of the spruce, which is wanting in the Pyrenees, and the substitution of *P. Laricio* (or probably *taurica*), for the *hispanica* in the middle region. In both chains the Silver Fir predominates over the other species, and in both the larch is wholly wanting.

In addition to more accurate information as to the actual zones or order of superposition, we should have been glad to know what tree forms the next parallel to the region of firs. In the corresponding region of Europe the beech holds that place, and it would be interesting to ascertain whether in that part of Asia it retains its position or is replaced by some other genus.

The observation of these writers on the wood of *A. Nordmanni* is extremely valuable, and indicates a point which ought to be attended to in all descriptions of new species when it is possible to obtain it.

The power of resisting the attacks of insects which most probably proceeds from the nature of the sap, is of immense importance in the economic value of the tree. I think the wood of *P. Cembra* possesses the same quality. A remark has been made to me respecting the softness of this latter species as affecting its durability. Neither hardness nor softness of texture in timber are positive proofs either of durability or of the contrary. Some oaks, as the *Ilex*, and some American species are both hard and heavy, yet are valueless as to duration. It may be doubtful whether the heart wood of *P. Cembra* would bear much exposure to damp, but with the outer layers which contain the turpentine it is of very great durability. I suspect the same qualities belong to the Cedar of Lebanon, while the testimony is positive that it was used for the roof of the Temple, and there is no doubt that in a dry climate, protected from the vicissitudes of weather, it might last during periods, for which its texture apparently makes it quite unfit when exposed to a humid atmosphere.

It is to be hoped that means will be taken by those individuals as well as bodies who have correspondents at Odessa, to procure the introduction of seed of these species, more especially of the *A. Nordmanni*, which appears to be the most valuable of them.

It is impossible to close this subject when the variety of species are called into question, without remarking on the neglect with which this important subject is still treated by the Government. With the most ample means, of every kind, with gardens and parks, of which the extent and capabilities are the admiration of every one, we do not possess a common public botanical garden or arboretum for study or for reference. This circumstance we cannot but consider as disreputable and disgraceful to the Government and to the country, immense sums being annually expended in the department to which it properly belongs without a thought being cast on the advancement of science.

Primitiæ Floræ Sarnicæ, or an Outline of the Flora of the Channel Islands of Jersey, Guernsey, Alderney, and Serk, &c. By Charles C. Babington, M.A., F.L.S., F.G.S., &c. &c. Longmans, and Baillière, 1839.

This little book is far superior in value to many a work of higher pretensions, and will not fail to interest the general student of European botany, as well as to find a place in the pocket of every botanical visitant of the district to which it has especial reference. In all probability too it will increase the number of such visitants to a

group of islands now, by the regular steam communication, so easy of access, and here shown to be so rich in botanical productions. The species enumerated amount "to 848," omitting (perhaps needlessly) as probably escaped from cultivation, 26 of those included in a catalogue by Professor La Gasca, lately published in a Report of the Jersey Agricultural and Horticultural Society. Cryptogamous plants also are excluded, with the exception of Ferns and *Characeæ*; the notice of the other orders of that class being almost confined to a bare list of Lichens, and a similar one of Algæ, in which last *Cystoseira barbata*, a very doubtful British species, is mentioned. The arrangement is according to the natural orders. Perhaps the Linnæan form might have proved more convenient to the majority of those likely to use the book as a vade-mecum. It has been the compiler's endeavour, he says, "to combine brevity with clearness; he has therefore only introduced descriptions or observations where either of them appeared to be really requisite, or where he conceived that he had some information to give." Thus the bulk of the volume is not increased, as is too commonly the case in local Floras, by characters and descriptions of well-known plants, often mere copies from standard works; but of such plants the trivial name alone, or with a few synonyms where they appeared requisite, is given with the localities; "the island in which a plant has been noticed being invariably mentioned," and under the more rare species the particular spots where they have occurred, together with the authority for the stations when the author himself has not gathered the plants. By far the greater number have been gathered by himself, in two visits to the islands in the summers of 1837 and 1838. Twenty-two of the species mentioned have not been published as British. Some of these however are now known to be natives of England.

The occasional remarks and descriptions are numerous, and of such a nature as to be interesting, as before intimated, to botanists in general, and not merely to those who have an opportunity of visiting the islands. They include critical remarks on differences, corrections of erroneous descriptions, investigations of synonyms, &c.; and throughout much regard for accuracy and much acuteness of observation are demonstrated, and much sound information is conveyed.

The preface contains, with other matters, an historical sketch of the little that had previously been done in the botany of the islands, beginning with the time of Ray, a short geographical notice of them, and a sketch of their geological structure; the last from the pen of F. C. Lukis, Esq. of Guernsey. It concludes with an expression of

hope, in which we concur, that the attention of botanists may be attracted to a field probably far from being exhausted, and a request that those who may be so fortunate as to add new species or to observe new localities will communicate them to the author at his publisher's, that they may be employed in the preparation of a new edition. Whenever this appears, and we should expect it to be soon called for, we trust that one blemish, against which, at the risk of appearing hypercritical, we must protest, will be removed, namely, the commencing of substantive trivial names, and those formed from the proper names of persons, contrary to usual custom, with a small letter.

Mr. Babington has also recently published a Supplement to his 'Flora Bathoniensis,' containing numerous additions to that little work.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

Mr. Waterhouse exhibited a new species of Hare from the collection made for the Society by the late Mr. Douglas, and proposed to characterize it under the name of *Lepus Bachmani*: he thought it probable that the species had been brought from California. It was thus described:

Lepus Bachmani. *Lep. intensè fuscus, pilis fuscescenti-flavo nigroque annulatis; abdomine sordidè albo: pedibus suprà pallidis, subtùs pilis densis sordidè fuscis indutis: caudâ brevi, albâ, suprà nigricante, flavido adspersâ: auribus externè pilis brevissimis cinerescenti-fuscis, internè albidis, ad marginem externum, et ad apicem flavescentibus obsitis: nuchâ pallidè fuscescenti-flavâ.*

"Fur long and soft, of a deep gray colour at the base; each hair annulated near the apex with pale brown, and black at the points; on the belly the hairs are whitish externally; on the chest and fore-part of the neck the hairs are coloured as those of the sides of the body; the visible portion is pale brown, each hair being dusky at the tip; chin and throat gray-white. The hairs of the head coloured like those of the body; an indistinct pale longitudinal dash on the flanks just above the haunches: the anal region white. The general colour of the *tarsus* above is white; the hairs, however, are grayish-white at the base, and then annulated with very pale buff colour (almost white), and pure white at the points; the sides of the *tarsus* are brown; the long hairs which cover the under part of the *tarsus*, as well as that of the fore-feet, deep brown. The fore-feet above very pale

brown, approaching to white; the hairs covering the toes principally white: the claws are slender and pointed, that of the longest toe very slender. Ears longer than the head, sparingly furnished with hair, the hairs minute and closely adpressed; externally, on the forepart, grizzled with black and yellowish white, on the hinder part grayish-white; the apical portion is obscurely margined with black; at the base the hairs are of a woolly nature, and of a very pale buff colour; the hairs on the occipital part of the head, and extending slightly on to the neck, are of the same colour and of the same woolly character; the ears internally are white, towards the posterior margin obscurely grizzled with blackish, at the margin yellowish.

Dimensions.	in.	lines.
Length	10	0
Tarsus	3	0
Tail and fur	1	3
Ear externally	2	8
Nose to ear	2	$5\frac{1}{2}$

Habitat S.W. coast of N. America, probably California.

"This animal may possibly not be adult; but neither in the teeth, so far as can be ascertained from a stuffed specimen, nor in the character of the fur, can I see any reason for believing it young, excepting that it is much under the ordinary size of the species of the genus to which it belongs; and although it may not be adult, it certainly is not a very young animal. Compared with *Lep. palustris*, with which species it was sent over by Mr. Douglas, it presents the following points of distinction. Although the present animal is not above one-third of the size of that species, the ears measure nearly a quarter of an inch more in length: in fact, they are here longer than the head, whereas in *Lep. palustris* they are much shorter. The next most important difference is in the feet,—which instead of having comparatively short and adpressed hairs which do not conceal the claws, are in *Lep. Bachmani* long and woolly, especially on the under part, and not only conceal the claws, but extend upwards of a quarter of an inch beyond their tips. The claws are more slender and pointed, especially those of the fore-feet. Besides these differences there are some others, which perhaps may be considered of minor importance: the fur is much softer and more dense; the longer hairs are extremely delicate, whilst in *Lep. palustris* they are harsh. As regards the colour, *Lep. palustris* has a very distinct rich yellow tint, which is not observed in the present species, the pale annulations of the hairs which produce the yellow tint, being replaced by brownish white or pale brown."

Mr. Owen concluded his memoir on the anatomy of the *Apteryx*

by a description of the general structure and peculiarities of its osseous system.

The bones of the *Apteryx* are not perforated for the admission of air, nor do they exhibit the pure white colour which characterizes the skeleton in other birds; their tough and somewhat coarse texture resembles rather that of the bones of the lizard tribe.

The spinal column was found to consist of 15 cervical and 9 dorsal *vertebræ*, and 22 in the lumbar, sacral, and caudal regions. The third to the sixth, inclusive, of the dorsal *vertebræ*, are slightly anchylosed together by the contiguous edges of their spinous processes; but Mr. Owen supposes that notwithstanding this *anchylosis*, a yielding, elastic movement may still take place between these *vertebræ*.

The cervical *vertebræ* present all the peculiarities of the type of Birds; the inverted bony arch for the protection of the carotid arteries, is first seen developed from the inner side of the inferior transverse processes of the twelfth cervical *vertebra*, but the two sides of the arch are not anchylosed together.

The *sternum* is reduced to its lowest grade of development in the *Apteryx*. In its small size, and in the total absence of a keel, it resembles that of the struthious birds, but differs in the presence of two subcircular perforations, situated on each side of the middle line, in the wide anterior emargination, and in the much greater extent of the two posterior fissures. The anterior margin presents no trace of a manubrial process, as in the Ostrich, the interspace between the articular cavities of the coracoid being, on the contrary, deeply concave.

After concluding the description of the osteology of the *Apteryx*, of which the preceding is an abstract, Prof. Owen proceeded to observe, "that so far as the natural affinities of a bird are elucidated by its skeleton, all the leading modifications of that basis of the organization of the *Apteryx* connect it closely with the struthious group. In the diminutive and keel-less *sternum* it agrees with all the known struthious species, and with these alone. The two posterior emarginations which we observe in the *sternum* of the Ostrich are present in a still greater degree in the *Apteryx*; but the feeble development of the anterior extremities, to the muscles of which the *sternum* is mainly subservient, as a basis of attachment, is the condition of a peculiarly incomplete state of the ossification of that bone of the *Apteryx*; and the two subcircular perforations which intervene between the origins of the pectoral muscle on the one side, and those of a large inferior dermo-cervical muscle on the other, form one of several unique structures in the anatomy of this bird. We have again

the struthious characters repeated in the atrophy of the bones of the wing, and the absence of the clavicles, as in the Emeu and Rhea*. Like testimony is borne by the expansively developed *iliac* and *sacral* bones, by the broad *ischium* and slender *pubis*, and by the long and narrow form of the *pelvis*: we begin to observe a deviation from the struthious type in the length of the *femur*, and a tendency to the gallinaceous type in the shortness of the *metatarsal* segment; the development of the fourth or inner toe may be regarded as another deviation, but it should be remembered that in the size and position of the latter the *Apteryx* closely corresponds with the extinct struthious Dodo. The claw on the inner toe of the *Apteryx* has been erroneously compared with the spur of certain *Gallinæ*, but it scarcely differs in form from the claws of the anterior toes.

"In the broad ribs (see the Cassowary), in the general freedom of *anchylosis* in the dorsal region of the vertebral column, and the numerous *vertebræ* of the neck, we again meet with *struthious* characters; and should it be objected to the latter particular, that some Palmipeds surpass the Ostrich in the number of cervical *vertebræ*, yet these stand out rather as exceptions in their particular order; while an excess over the average number of cervical *vertebræ* in birds is constant in the *struthious* or *Brevipennate* order. Thus in the Cassowary 19 *vertebræ* precede that which supports a rib connected with the *sternum*, and of these 19 we may fairly reckon 16 as analogous to the cervical *vertebræ* in other birds. In the Rhea there are also 16 *cervical vertebræ*, and not 14, as Cuvier states. In the Ostrich there are 18, in the Emeu 19 cervical *vertebræ*. In the *Apteryx* we should reckon 16 cervical *vertebræ* if we included that which supports the short rudimental but moveable pair of ribs. Of the 22 true grallatorial birds cited in Cuvier's Table of the Number of Vertebræ, only 9 have more than 14 cervical *vertebræ*; while the *Apteryx* with 15 cervical *vertebræ*, considered as a struthious bird, has the fewest of its order. The free bony appendages of the ribs, and the universal absence of air-cells in the skeleton, are conditions in which the *Apteryx* resembles the *Aptenodites*, but here all resemblance ceases: the position in which the *Apteryx* was originally figured† is incompatible with its organization.

"The modifications of the skull of the *Apteryx*, in conformity with the structure of the beak requisite for obtaining its appropriate food,

* In the Ostrich the clavicles are undoubtedly present, though anchylosed, with the *scapula* and *coracoids*, and separate from each other. In the Cassowary they exist as separate short styliform bones.

† Shaw's Miscellany, xxiv. pl. 1075.

are undoubtedly extreme; yet we perceive in the *cere* which covers the base of the bill in the entire *Apteryx* a structure which exists in all the struthious birds; and the anterior position of the nostrils in the subattenuated beak of the Cassowary is an evident approach to that very singular one which peculiarly characterizes the *Apteryx*. With regard to the digestive organs, it is interesting to remark, that the thickened muscular *parietes* of the stomach of the most strictly granivorous of the struthious birds do not exhibit that apparatus of distinct *Musculi digastrici* and *laterales* which forms the characteristic structure of the gizzard of the gallinaceous order: the *Apteryx*, in the form and structure of its stomach, adheres to the struthious type. It differs again in a marked degree from the *Gallinæ*, in the absence of a crop. With respect to the *cæcal* appendages of the intestine, though generally long in the *Gallinæ*, they are subject to great variety in both the struthious and grallatorial orders: their extreme length and complicated structure in the Ostrich and Rhea form a peculiarity only met with in these birds. In the Cassowary, on the other hand, the *cæca* are described by the French academicians as entirely absent. Cuvier* speaks of 'un cæcum unique' in the Emeu. In my dissections of these struthious birds I have always found the two normal *cæca* present, but small; in the Emeu measuring about five inches long and half an inch in diameter; in the Cassowary measuring about four inches in length. The presence of two moderately developed *cæca* in the *Apteryx* affords therefore no indication of its recession from the struthious type: these *cæca* correspond in their condition, as they do in the other struthious birds, with the nature of the nutriment of the species. It is dependent on this circumstance also, that in the grallatorial bird (*Ibis*), which the *Apteryx* most resembles in the structure of its beak, and consequently in the nature of its food, the *cæca* have nearly the same relative size; but as regards the *Grallæ*, taken as an order, no one condition of the *cæca* can be predicated as characteristic of them. In most they are very small; in many single.

"What evidence, we next ask, does the generative system afford of the affinities of the *Apteryx*? A single, well-developed, inferiorly grooved, subspiral, intromittent organ attests unequivocally its relations to the struthious group; and this structure, with the modifications of the plumage, and the peculiarities of the skeleton, lead me to the same conclusion at which I formerly arrived†, from a study of the external organization of the *Apteryx*, viz. that it must rank as

* *Leçons d'Anat. Comp.* 1836. iv. p. 291.

† Art. *Aves*, Cycl. of Anat. and Phys., i. 1836, p. 269.

a genus of the cursorial or struthious order; and that in deviating from the type of this order it manifests a tendency in one direction, as in the feet, to the gallinaceous order; and in another, as in the beak, to the *Grallæ*; but that it cannot, without violation of its natural affinities, be classed with either."

A living specimen of the *Gymnotus electricus*, from the Amazon, was exhibited by Mr. Porter.

September 11th, 1838.—Lieut. Col. Sykes, in the Chair.

Some notes were read by the Chairman upon three skins of digitigrade *carnivora*, which were on the table for exhibition: one of these was a beautiful skin of the *Aguara Guazu* of Azara, (*Canis jubatus*, Desm.) and the other two, those of the *Felis Pardina*, Temm., in an adult and nonadult state. Respecting the first of these Col. Sykes offered the following observations:

"Azara in his preliminary notices of the two species of *Canis*, *C. jubatus* and *C. Azaræ*, says, I prefer for the family the Spanish names of Zorro or Fox to the Guaranese name Aguara, which also means fox; and he accordingly heads the notices with the words 'Zorros or Foxes.' The *C. jubatus*, measuring 5 feet to the tail, and the tail of which is 19 inches, is certainly a Brobdignag Fox. I mention this circumstance in illustration of the fact, that Azara, in his classification, appears to have overlooked analogies. And this remissness I hope will authorize me, without the imputation of presumption, in venturing upon the remarks I am about to make.

"The skin I put before the Society is that of Azara's *Canis jubatus*, and as it and a fellow skin in my possession are the only specimens of the kind in England (indeed I believe there are only two other specimens in Europe, one in Paris, the other in Cadiz), and as it will most probably have been seen but by few of the gentlemen present, I shall be happy to find that its exhibition is acceptable. Azara states that the *Canis jubatus* has 6 incisors in the upper jaw, then on either side of a vacant space follow 2 canines and 6 molar teeth, three of which, however, look more like incisors than molars; the lower jaw is in all respects similar to the upper, except that the interval is wanting between the canine teeth and the incisors, and there is one additional molar tooth; in other respects the form and general character of these animals are those of the Dog: they differ, however, chiefly in being *unsociable* and *nocturnal*. The tail is much *thicker* and *more bushy*, and they never raise or curl it; the *body* and *neck* are *shorter* and covered with longer fur; the *neck* is also *thicker*; the hair too is thicker; the eye is smaller, the face flatter; the *head*

rounder and *more bulky* as far as the front of the eyes, where the thick part diminishes more speedily and terminates in a sharper muzzle, furnished with whiskers; the ear is broader at its origin, and thicker and stiffer, and when they are on the look-out they present the hollow part forwards and approximate their ears much more than Dogs. They do not bark nor howl like Dogs, nor is their voice heard often; in fact they so cry but seldom, and submit to be killed without uttering a sound. Other discrepancies between his two 'Zorros' and Dogs are added, but it is unnecessary to specify them. I perfectly agree with Azara that he has afforded sufficient proofs of the wide difference between the *Canis jubatus* and Dogs (the most striking part of which difference, however, he has omitted to characterize, viz. the long mane), but here my coincidence in opinion ceases, for it is evident that the animal of which the skin lies upon the table has not the slightest approximation to the character of a Fox, which Azara would make it. A question is thus opened, to what genus or subgenus of the second division of *digitigrada* does the animal belong? Unfortunately the skins in my possession do not afford the means of fixing definitively its place in the family, there being neither skull nor teeth, no toes, and no means of determining whether or not an anal pouch existed. Azara's dental characters are applicable to the genus *Canis*, but he has omitted to notice those minute points which might constitute subgeneric differences. One fact mentioned, that the canines of the *only* adult he examined were ten lines long, although they were very much worn, would apply rather to *Hyæna* than to *Canis*. The number of toes is omitted. Buffon calls the *Canis jubatus* the Red Wolf; but, were not its solitary and nocturnal habits and its predilection for certain fruits and vegetables sufficient to separate it, the remarkable mane at once prevents the alliance. Apparently, therefore, being neither fox, dog, nor wolf, it may be permitted us to look to a neighbouring genus, to see whether or not there are more characteristics common to the animal under consideration and species of that genus than we have yet met with.

"While residing with my family at Cadiz during the spring, three beautiful skins were imported from Buenos Ayres; they were quite unknown to the owner and his friends, and learning that I took an interest in natural history, I was asked to examine and give my opinion upon them. The heavy head, the large ears, the bulky body and comparatively slender hind-limbs, the short neck, the shaggy hair, but particularly the singular mane, fixed my attention; and in the absence of primary generic characters, I would have pronounced the

skins to be those of a beautiful species of *Hyæna*: but the few naturalists who have examined the New World have not yet discovered the Hyæna, and it would have been rash, with the slender data before me, to have expressed a definitive opinion. Nevertheless on returning to England and deliberately examining Azara's description of the form and habits of the *Canis jubatus*, my original opinion is so much strengthened that I am induced to submit the whole question to the consideration of naturalists, in the hope that on an opportunity occurring it may be taken advantage of to determine the primary generic characters, with a view to the allocation of the animal into its exact place in the digitigrade family. But to me it is a matter of indifference whether or not the animal has the technical characters of *Canis* or *Hyæna*. Nature, in her wondrous chain of animated beings dispersed over the world, is never defective in a link (at least on the great continents), for if the identical species of one continent be wanting, in another we surely find its analogue. The Ostrich of Africa has its analogue in America in the *Rhea*, and in the *Emu* and Cassowary of Australia: the *Llama* replaces the Camel, and the *Felis concolor*, the Lion in America; but the numerous cases are familiar to all naturalists and need not be enumerated; and with respect to the Aguara Guazu (*Canis jubatus*), if it be not an *Hyæna*, it is at least the analogue of the *Hyæna*. The multitudinous reasons of Azara already quoted against his two Zorros being Dogs, may be applied almost *verbatim* in proof of *one* of them being an *Hyæna*; and in his detailed description of the Aguara Guazu he mentions many of its habits that are common to the *Hyæna vulgaris*—its walk with long paces, its absence of a predal disposition on living animals (Azara instances poultry not being touched while passing within reach of the animal he had chained up) in its wild state, not committing havock amongst herds or lesser flocks, and its indifference to a meat or vegetable diet, indeed its predilection for fruits and sugar cane. An *Hyæna* I brought from India with me, and which is now living in the Zoological Gardens, Regent's Park, London, and which is as affectionate to me as a spaniel dog would be, was fed during the whole voyage from India on boiled rice and a little ghee (liquid butter;) and these instances of a community of habits between the Hyæna and *Canis jubatus* could be greatly multiplied. If Azara's dental formula be right, the Aguara Guazu cannot technically be an *Hyæna*, and it may be desirable to constitute it a subgenus; but as I before said, it will suffice if my speculations assist in any way to rivet a link in the chain of nature."

With respect to the skin of *Felis Pardina* Col. Sykes remarked,

"Although Temminck, in his *Monographie de Mammalogie*, p. 116, in a note, says the skin of this European *Felis* is well known amongst the furriers as the Lynx of Portugal, I have nowhere been able to meet with a specimen in London; and as amongst my friends scarcely any one appeared to be aware of the existence of a Spanish Lynx, I thought it might be acceptable to the members to exhibit specimens in a state of maturity and nonage. In Andalusia, whence the specimens come, it is called *Gāto clavo* (*clavo* meaning the pupil of the eye), illustrative of the spotted character of the skin. Some peasants in Andalusia make short jackets of the skins. The animal inhabits the Sierra Morena. I bought both skins at Seville for thirty reales, about 6*s*. 3*d*. Neither the British Museum nor the Zoological Society have specimens.

"Temminck describes the *Pardina* as 'Toutes les parties du corps *lustre*, à peu près de la même teinte que dans le caracal.' This is certainly not the description of my animal, the colour of the adult being reddish gray, and that of the non-adult light fawn; nevertheless there are so many other points common to both, that it would be unadvisable to consider them distinct."

A specimen of the *Alauda Calandra*, Linn., from Andalusia, was afterwards exhibited by Col. Sykes, accompanied with the following notice:

"I brought two specimens of these delightful singing-birds from Andalusia with me this spring; and on comparing them with the type of the genus, I am satisfied they approximate more closely to the genus *Mirafra* than to that of *Alauda*. The bill is infinitely more robust than that of *Alauda*. The size of the bird is larger, and its *ensemble* rather that of *Mirafra* than *Alauda*, and the internal organization has a close resemblance to the former, in the proportional length of the intestines and the *colon*, in the form of the lobes of the liver, in the spleen, in the size of the gizzard and substance of the digastric muscles, and particularly in the form and position of the *cæca*. Mr. Yarrell very justly remarks, that the bird in departing from the type of Lark approaches to that of *Plectrophanes* of Meyer; but differs from the latter in not having a curved long hind claw, and also in its more robust character; in short, it has a station between the Larks and the Finches; it differs also slightly from *Mirafra* in its hind claws being those of a Lark, while its bill and other external and internal characters are those of *Mirafra*. On the whole, therefore, it appears desirable to divide the genus *Alauda* into subgenera, and constitute the *Londra* a new subgenus, to which the

name of *Londra* may be given. The Andalusian bird would thus be the *Londra Calandra*, and an undescribed species from China, now in the gardens of the Society, appears to form a second example of this genus. The generic characters of *Londra* are as follow:

LONDRA. Genus novum.

Rostrum crassum; capitis longitudinem æquans; basi altum, subcompressum; maxilla arcuata; tomiis integerrimis.

Nares plumis anticum versus tectæ.

Alæ corpore longiores, acuminatæ; remigibus, primâ sub-abbreviatâ, tertiâ longissimâ, secundâ et quartâ ferè æqualibus; reliquis gradatim brevioribus.

Cauda cuneata.

Pedes robusti; *unguis* hallucis rectus elongatus.

Typus est, *Alauda Calandra*.

"The specific characters of *Londra Calandra* as published are sufficiently accurate.

"The following are the measurements of a male bird; and as I have seen many scores of them, I think I may say they would apply to the generality of individuals of the species.

"Length, from the tip of the bill to the rump, 5 inches; bill, $\frac{1}{2}\frac{8}{0}$; tail, $2\frac{1}{2}$ inches; *tibia*, $1\ \frac{1}{2}\frac{1}{0}$; *tarsi*, including nail, $1\frac{1}{1}\frac{1}{0}$; hind claw, $\frac{1}{2}\frac{1}{0}$ inch; liver of two lobes, one much longer than the other; gall-bladder fully developed; spleen cylindrical, $\frac{6}{1}\frac{}{0}$ inch; intestines, $9\ \frac{3}{1}\frac{}{0}$ inches; *duodenum* very wide; small intestines narrow; *cæca*, $\frac{1}{1}\frac{}{0}$, little more than oblong specks; *colon*, $\frac{1}{2}$ inch long; gizzard very small; but digastric muscle, $\frac{3}{2}\frac{}{0}$ inch thick; *testes* very large, nearly globular; *irides* black. These birds are fed upon canary seed in Andalusia, but in Lisbon they are fed upon wheat; nevertheless they are fond of raw meat, flies, and worms. They are soon accustomed to confinement, and they sing unconcernedly, although surrounded by spectators; their notes, some of which are a kind of double-tongueing in the phrase of flute players, are remarkably rich and full."

Mr. Blyth made some remarks on the plumage and progressive changes of the Crossbills, stating that, contrary to what has generally been asserted, neither the red nor saffron-tinted garb is indicative of any particular age. He had known specimens to acquire a second time the red plumage, and that much brighter than before; and he exhibited to the Meeting two individuals recently shot from a flock in the vicinity of the metropolis, which were exchanging their striated nestling feathers for the saffron-coloured dress commonly described to be never acquired before the second moulting.

He also exhibited a Linnet killed during the height of the breeding season, when the crown and breast of that species are ordinarily bright crimson, in which those parts were of the same hue as in many Crossbills; and observed that the same variations were noticeable in the genera *Corythraix* and *Erythrospiza*. Mr. Blyth called attention also to the fact, that in the genus *Linota* the females occasionally assumed the red breast, supposed to be peculiar to the other sex, and that they continue to produce eggs when in this livery; a circumstance very apt to escape attention, as most naturalists would at once conclude such specimens to be males without further examination.

October 9, 1838.—Rev. F. W. Hope in the Chair.

The reading of a paper by Richard Owen, Esq., on the Osteology of the *Marsupialia*, was commenced.

Mr. Martin drew the attention of the Meeting to the crania of the Sooty and White-eyelid Monkeys, *Cercopithecus fuliginosus* and *C. Æthiops*, which were placed upon the table, and upon which he proceeded to remark as follows:

"It is now some years since I stated to the late Mr. Bennett that in the skeleton of a Sooty Monkey I had discovered the presence of a distinct fifth tubercle on the last molar of the lower jaw; recently I have observed the same fact in the skull of the Collared or White-eyelid Monkey (*C. Æthiops*), circumstances of some interest, as this tubercle appears to be always absent in the *Cercopitheci*, and also in such as the Malbrouck, Grivet, and Green Monkeys, &c., which have been separated from the *Cercopitheci* under the subgeneric title *Cercocebus*, Geoff., the Sooty and the White-eyelid Monkeys being included; though, as far as we can see, on no feasible grounds, differing from the foregoing species, as they do, in physiognomy and also in style of colouring. However this may be, the Sooty and White-eyelid Monkeys approximate to their supposed congeners in a more remote degree than has hitherto been supposed. Now with regard to the genera *Semnopithecus* and *Macacus*, both of which are from India, and the African genera *Inuus* and *Cynocephalus*, this fifth tubercle is a constant character and accompanied by the presence of laryngeal sacculi; and in another African genus, viz. *Colobus*, a fifth tubercle also exists, but whether accompanied or not by laryngeal sacs is still to be determined. May not this fifth tubercle, it may here be asked, bring the Sooty and White-eyelid Monkeys within the pale of the *Macaci*? and the question will bear considering. Our reply, however, would be in the negative; for as we have ascertained

by dissection, the Sooty Monkey, at least, is destitute of laryngeal sacs, (but has large cheek pouches) and we may readily infer the same of the other species, its immediate ally. The relationship, as it appears to us, between these two animals and the Indian *Macaci*, is that of representation. They have not indeed the muzzle so produced and the supra-orbital ridge so developed as in the *Macaci*; but in these points they exceed the African Guenons generally, and are also we think stouter in their proportions. They appear, indeed, to constitute a form, intermediate between the *Macaci* and *Cercopitheci*, on the one hand; as are the *Colobi* between the *Semnopitheci* and *Cercopitheci* on the other. What the *Colobi* of Africa are to the *Semnopitheci*, these two monkeys (and others have perhaps to be added) are to the *Macaci*. With respect to the genus *Cercocebus*, I should be inclined to restrict it, excluding from it the Grivet and Green Monkeys, and modify its characters accordingly, taking the Sooty and White-eyelid Monkeys as its typical examples, a plan which, it appears to me, is preferable to the creation of a new generic title, which often leads to confusion."

Mr. Owen exhibited a preparation of the *ligamentum teres* in the Coypou, which he had received from Mr. Otley of Exeter.

TWEEDSIDE PHYSICAL AND ANTIQUARIAN SOCIETY.

A stated Quarterly meeting of this Society, the establishment of which we mentioned in vol. i. p. 159, was held at Kelso on Monday last, Major Watson, Woodside, in the Chair. The donations reported as received since last meeting, and those announced as now on their way from various contributors, were of a description equally interesting and valuable with any that have been noticed at the previous meetings of the Society.

From Mr. Herman, London.—Magnificent tiger skin. The animal, when alive, must have measured fully 11 feet from tip to tip.

From Mr. Wilkie of Ladythorn.—Three fine specimens of foreign shells (Pearl Nautilus and Leopard Cowries).

It was announced to the meeting that Mr. Selby of Twizel, one of the most distinguished of our native naturalists, had signified his intention of presenting to the Society the appropriate and valuable donation of a collection of Scottish insects.

Specimens of native birds have been received from the Rev. Joseph Train; Mr. Gilbert Bruce; Mr. John S. M'Dougal, Coldstream; Mr. Johnston, Todrig, &c. Of these we may mention the following:—

The Shieldrake (*Tadorna Bellonii*), M. and F.
Crested Cormorant (*Phalacrocorax cristatus*), M. and F.
Little Grebe (*Podiceps minor*), M.
Jack Snipe (*Scolopax Gallinula*), M.
Long-tailed Titmouse (*Parus caudatus*), M. and F.
Black-headed Bunting (*Emberiza Schœniculus*), M. and F.
Mountain Finch (*Fringilla Montifringilla*), M. and F.
Common Linnet (*F. cannabina*), M. and F.

Contributions towards the ornithological department of the collection are received with gratitude, and we are glad to perceive that the friends of the Institution do not weary in their exertions.

It is always agreeable for us to dwell upon the continued prosperity of the Institution whose proceedings we are now noticing. We have stated, that even the attempt to establish it was creditable to the district, and that it is doubly creditable that it should have been hitherto constantly supported in so efficient a manner by nearly every grade of the community.

We ought to mention that the prospect of the Society's being able to present the new building to the public, free of debt, is daily improving, though not yet fully realized; but as the Institution continues to find additional friends, in proportion as it shows more sure tokens of permanence and usefulness, we do not doubt that at the period of our next report we shall have it in our power to state that the whole of the necessary funds have been collected.

BOTANICAL SOCIETY OF EDINBURGH.

April 11, 1839.—Prof. Graham, President, in the Chair.

His Majesty Frederick William III. King of Prussia, was elected a Foreign Honorary Member, by unanimous acclamation.

The President read the conclusion of his report on the Progress and State of Botany in Britain during the last twelve months, which we have already had occasion to notice at p. 53 of the present volume.

The Secretary read a communication from Mr. William Gardiner, jun., of Dundee, accompanying a specimen of *Mucor* new to the British Flora, found in the neighbourhood of Dundee in 1836, and supposed by Sir William Hooker to be *Phycomyces splendens* of Fries, or perhaps the *Ulva nitens* of Agardh.

Mr. Brand read a communication from Mr. George Dickie, of Aberdeen, on the Vegetation of Davis' Straits, in which the author noticed various circumstances, and suggested some inquiries of an interesting nature connected with the range and distribution of species in that region.

Mr. Thomas Wood Morrison laid before the Society engravings

of some rare plants, splendidly figured in Audubon's great work on North American Ornithology, viz. *Platanus racemosus*, Columbia river; *Cornus Nuttali*, Columbia river; *Iris cuprea*, Louisiana; *Nymphæa flava*, Florida. The President requested Mr. Morrison to convey to Mr. Audubon the thanks of the Society for his kindness in allowing the engravings to be exhibited.

Mr. Edward Forbes read a second notice on certain Continental plants allied to British species. Specimens of the following were exhibited, and their alliances and synonyms amongst British species pointed out. 1. *Silene Pseud-Otites*, Bess, from Monte Spaccato; 2. *Silene livida*, Willd., from Monte Spaccato; 3. *Gentiana angulosa*, Bieb., from Carniola; 4. *Plantago carinata*, Schrad., from Adelsberg in Carniola; 5. *Plantago altissima*, Jacq., from Gaule, near Trieste; 6. *Holoschœnus australis*, Reich., near Trieste; 7. *Bupleurum protractum*, Link, from Istria; 8. *Lotus ciliatus*, Ten., from Trieste; 9. *Onobrychis arenaria*, Kitt, near Trieste.

The Society then adjourned till Thursday, the 9th of May, when the summer meetings at the Royal Botanic Garden will be resumed.

MISCELLANEOUS.

ON THE WILD CATTLE OF GREAT BRITAIN.

As an addition to the notices of the wild cattle of Great Britain, for which our Journal is indebted to the contributions of Mr. Hindmarsh, the Earl of Tankerville, and Sir Philip Grey Egerton*, the following passage from Matthew Paris may be of some interest, as showing that herds of these "boves sylvestres †" existed not only in the forests of Caledonia and the north of England, but in the midland districts. In his account of Leofstan, one of the abbots of St. Albans in the time of Edward the Confessor, he says:

"Opaca nemora quæ a limbo *Ciltriæ* usque Londoniam fere, a parte septentrionali ubi præcipue strata regia quæ Watlingestrata dicitur, fecit resecari, salebras explanari, pontes fabricari, et abrupta viarum in planitiem redigi tutiorem. Abundabant enim eo tempore per totam *Ciltriam* nemora spatiosa, densa et copiosa, in quibus habitabant diversæ bestiæ, lupi, apri, tauri sylvestres, et cervi, abundanter."—*Vitæ Sancti Albani Abbatum*, p. 28.

These great forests of the Chiltern district of Buckinghamshire, Herts, &c., were those in which the Saxon chieftains, aided by some of the citizens of London, for a long time held out against the Norman conqueror, under the countenance of Abbot Fretheric; and where, in subsequent times, the citizens maintained their right of hunting,

* Vol. ii. p. 274; iii. 241.

† See the passage from Bishop Leslie, vol. ii. p. 282.

which was thus recognised in the charter of Hen. I. and those of several succeeding reigns: "et cives London habeant fugaciones suas ad fugandum sicut melius et plenius habuerint antecessores eorum, sc. in Chiltre, &c."—R. T.

ON A NEW SPECIES OF *SEPIOLA*.

MM. Gervais and Vanbeneden have lately presented to the Acad. des Scienc. de Bruxelles a memoir on the genus *Sepiola*, and in a subsequent note have described a new species under the name of *macrosoma* from the Bay of Naples, and figured in Della Chiaje's 'Memorie sugli animali senza vertebre,' pl. 71. fig. 1—2. The most remarkable fact found by the authors in examining this species was the existence of an inferior eyelid, which in a certain degree calls to mind the principal character on which R. Owen established his *Rossia palpebrosa*. The *Sep. macrosoma* has moreover in common with this a very extraordinary size. It would perhaps be necessary, did we not place entire confidence in the accurate descriptions of the learned Englishman, to compare individuals of the two species. However their geographical distribution alone would authorize their separation, the one having been discovered by Capt. Ross at the Arctic Pole, while our species inhabits the Bay of Naples.

The body is globular and perfectly rounded at its posterior part. The arms are placed about middle way, they are by some lines closer together beneath than above. The mantle does not present any point of adhesion with the body in its inferior or anal portion; it is only at the nuchal or superior part that a junction of a small extent is perceived. The dorsal plate is larger in front than behind, and gradually becomes narrow. It is undoubtedly the largest species of the genus. If we compare it with the *S. palpebrosa* we first see the eye-ball protected by a palpebral fold in both species, but in the northern one the eyelids completely hide the eyes, and there exists one above and one below, although the latter is the largest. In our species we cannot find a trace of any superior eyelid, consequently the eye is not completely closed.

R. Owen supposes that these eyelids serve the species inhabiting the cold countries to protect the eye-ball against the fragments of ice, but the existence of eyelids in a Neapolitan species necessarily destroys this supposition.

The body is much less elongated in our species, and the arms are not inserted so near the front margin of the mantle, they are also perfectly rounded. The arms have the same proportions in the two species, with this exception, that in the northern species the third pair surpasses the fourth considerably. The tentacula are longer in the Neapolitan species.

	inch.	lin.
Length of body and head without the arms .	3	0
——— of the longest arms	1	9
——— of the tentacula	4	5
——— of the dorsal plate	0	8
Breadth at the root of the arms	1	0
——— of the arms	0	9

M. Delle Chiaje possesses one double the size of this.—*Bulletin de l'Acad. de Bruxelles*, Jan. 1839.

[We do not see how the existence of a Cephalopod in the Mediterranean with one eyelid inadequate to protect the eye-ball is conclusive against the use assigned by Mr. Owen to a peculiarly perfect defensive palpebral organization in a Cephalopod inhabiting seas which in the summer are crowded with spicular crystals of ice.—Edit.]

ON THE *NEMATOIDEA*. BY DR. CREPLIN.

I take this opportunity of drawing the attention of naturalists to a law which from many years' personal observations, as well as from those of others, I have constantly found to hold good: viz. that a *Nematoidean* living singly in a cyst, inclosed on all sides, or enveloped closely in a membrane, *never* possesses sexual organs.

Rudolphi everywhere states, when speaking of *Nematoidea* so inclosed, that he had never been able to discover generative organs in any of them. It is true that he mentions in his 'Entoz. Hist. Nat.' ii. p. 152. a sexual difference in *Ascaris* (e mesenterio *Cotti scorpii*) *angulata*, but he does not prove by his remarks the accuracy of his assertion; and when Zeder 'Naturgeschichte,' § 53, 54 talks of an ovarium and probable seminal vessels in his *Capsularia*, he by no means proves that the organs observed possess the functions he ascribes to them. I confine myself at present to this short notice without enumerating those species which I have examined, as I think of describing them elsewhere, and take the liberty of requesting helminthologists to be so kind as to give publicity to their observations, with a view to the confirmation or refutation of the universality of the above law.—*Wiegmann's Archiv*, vol. iv. part V.

[We may observe that the organization of the incysted microscopic Entozoon (*Trichina spiralis*, O.), discovered by Mr. Owen in the human muscles, accords with the generalization enunciated by Dr. Creplin.—Edit.]

ACTION OF FROST ON PLANTS.

M. Morren has recently laid before the Academy of Brussels an account of his investigations relative to the action of cold on plants, the results of which are, that however delicate the organization of the plants, not one of their elementary parts is ruptured by the action of the frost, but the functions are entirely deranged; thus the organs of respiration are filled with water, and those of nutrition with air; so that the natural order is perverted, and death is the consequence.

BIRTH OF A GIRAFFE AT THE GARDEN OF THE ZOOLOGICAL SOCIETY.

The following particulars of the birth of the young Giraffe were communicated to the Zool. Soc. at the Meeting on Tuesday evening last by Professor Owen.

"The Giraffe brought forth a young male June 19th, after a gestation of 15 lunar months. The young animal was able to stand a few hours after birth, and could reach the height of six feet. He was capering about the day after he was born, and shows a remarkable degree of development and strength, as might be expected from the long period of gestation. The mother, though not unkind to her offspring, refuses to suckle him; but there seems to be no difficulty in bringing him up by hand. Admeasurements of the different parts of the young animal were given, and the anatomy of the fœtal membranes and cotyledons described. Drawings of the mother and her young, by Mr. Hills, the well-known animal painter, were exhibited to the meeting."

METEOROLOGICAL OBSERVATIONS FOR MAY, 1839.

Chiswick.—May 1—6. Very fine. 7. Clear and dry. 8. Fine: much thunder and lightning at night. 9, 10. Cloudy and cold. 11. Fine, but cold. 12. Cloudy: rain. 13. Clear. 14. Cold rain. 15, 16. Clear: cloudy and cold: frosty at night. 17. Fine: frosty at night. 18. Very fine. 19. Overcast. 20. Very fine. 21. Dry haze. 22—25. Cold and dry. 26. Dry haze: fine. 27—31. Fine.—The weather at the commencement of the month was very fine, but after the thunder on the 8th it became cold and unseasonable. The nights were generally cold, and between the 14th and 17th they were successively frosty.

Boston.—May 1. Fine. 2. Cloudy: rain P.M. 3. Cloudy. 4—8. Fine. 9. Cloudy: rain A.M. and P.M. 10. Stormy: rain early A.M. 11. Cloudy: rain P.M. 12. Rain: rain early A.M.: rain A.M. 13. Cloudy. 14. Cloudy: rain and hail P.M. 15. Cloudy. 16—18. Fine. 19. Cloudy: rain early A.M. 20. Fine. 21. Cloudy. 22. Rain. 23. Fine. 24. Rain. 25. Cloudy. 26, 27. Fine. 28. Cloudy. 29. Fine. 30, 31. Cloudy.

Applegarth Manse, Dumfries-shire.—May 1. Beautiful summer day: heavy dew. 2. The same, but droughty. 3. Still fine, though getting cloudy. 4. Gentle rain all day: everything refreshed. 5. Moist A.M.: cleared up P.M. 6. Fine day: evening cool. 7. Hoar frost early A.M.: clear and calm. 8. Very warm: air electrical: cool P.M. 9. Dry and parching: very chill. 10. Withering day: wind piercing. 11. Wind changed to N.W.: returned to E. P.M. 12. Calm and warm: cool P.M. 13. Cloudy: very slight showers. 14. Frost: ice on the pools: slight snow showers. 15. Strong frost A.M.: getting cloudy: slight showers. 16. Temperature rising, but still cold. 17. Getting cloudy, but barometer still rising. 18. Fine soft rain nearly all day. 19. Warm and sunny throughout. 20. Beautiful summer day. 21. Very droughty, though one or two slight showers. 22. Withering day. 23. Boisterous weather and withering. 24. Temperature improving: cool P.M. 25. Quiet day: bright sunshine. 26. The same: rather showery P.M. 27. Droughty in the extreme. 28. Atmosphere highly electrical. 29—31. Not a cloud visible.

Sun shone 29 days. Rain fell 4 days. Frost 2 days. Snow 1 day.

Wind northerly 13 days. Southerly 11 days. Easterly 5 days. Westerly 2 days.

Calm weather 11 days. Brisk 6 days. Moderate 9 days. Boisterous 3 days. Strong steady breeze 2 days.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. ROBERTON; *by* Mr. THOMPSON *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. VEALL *at Boston, and by* Mr. DUNBAR *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1839. May.	Barometer.						Thermometer.									Wind.				Rain.				Dew point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc.			Chiswick.		Boston. 8½ a.m.	Dumfries-shire.			London: Roy. Soc. 9 a.m.	Chiswick 1 p.m.	Bost.	Dumfries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	8½ p.m.	Fahr. 9 a.m.	Self-register. Max.	Min.	Max.	Min.		9a.m.	9pm.										
1.	29·986	29·992	29·891	29·45	29·94	29·92	56·0	61·2	51·8	73	35	61	52½	53		SW.	NE.	calm	S.	…	…	…	…	48
2.	29·948	29·967	29·916	29·44	29·99	29·98	60·4	64·2	51·6	72	43	57	54½	50		NW.	NE.	calm	ESE.	…	…	…	…	49
3.	29·976	29·974	29·889	29·50	29·92	29·89	53·6	66·3	45·8	70	43	50	55	50		NNW.	NW.	calm	SSW.	…	…	·03	…	51
4.	29·832	29·825	29·679	29·33	29·68	29·57	59·3	61·6	51·0	71	48	57	48	49		E.	S.	calm	S.	…	…	…	…	50
5.	29·686	29·838	29·669	29·05	29·62	29·90	57·4	66·7	51·9	71	44	62·5	56	48		S.	S.	calm	E.	…	…	…	…	52
☾ 6.	29·946	30·040	29·921	29·53	30·10	30·15	59·7	66·7	46·0	69	43	56	50	40		NE.	NE.	E.	NE.	…	…	…	0·30	51
7.	30·066	30·045	29·973	29·68	30·12	30·03	55·4	63·2	43·2	71	41	52·5	51½	55		NE.	E.	E.	S.	…	…	…	…	47
8.	29·894	29·896	29·843	29·53	29·98	29·98	57·9	61·3	43·7	72	44	53	58	48½		NE.	E.	E.	S.	…	·13	…	…	48
9.	29·872	29·865	29·819	29·53	30·07	30·13	47·2	67·4	46·3	53	39	47	40½	37		NNE.	NE.	NE.	NNE.	·338	·42	…	…	47
10.	29·864	30·026	29·871	29·53	30·19	30·26	45·4	51·9	41·0	55	42	43·5	46	40		N.	NE.	E.	NE.	·422	…	·14	…	43
11.	30·160	30·145	29·988	29·78	30·24	30·12	47·7	51·4	42·2	55	38	45	47	47½		N.	NE.	NE.	NW.	·033	…	…	…	42
12.	30·044	30·063	30·052	29·57	30·14	30·06	48·3	51·3	41·3	58	41	46	53½	50½		NW.	NE.	calm	NW.	…	·10	·12	…	42
● 13.	29·920	29·947	29·662	29·35	29·77	29·77	49·2	58·8	42·3	64	34	53	55½	36		NW.	W.	W.	NW.	·068	·13	·06	…	42
14.	29·548	29·574	29·490	29·15	29·67	29·49	39·2	50·7	36·2	52	29	43	45½	36½		NW.	N.	N.E	N.	·172	·01	…	0·00	39
15.	29·386	29·400	29·357	28·97	29·35	29·30	45·2	56·8	35·4	53	28	44·5	41½	39½		SE.	S.	calm	NW.	·016	…	·10	…	38
16.	29·556	29·816	29·550	29·05	29·33	29·62	46·4	63·4	33·7	58	28	47	45	43		S.	S.	NW.	W.	·166	…	…	…	35
17.	30·020	30·099	29·999	29·50	29·78	29·83	50·2	59·8	39·0	63	31	53	48½	48		S.	W.	calm	S.	…	…	…	…	37
18.	30·124	30·117	30·068	29·62	29·81	29·76	53·7	69·6	42·8	64	50	56	51	50		S.	SW.	W.	S.	…	·03	…	…	42
19.	30·066	30·173	30·066	29·43	29·94	30·10	53·7	54·3	52·2	70	50	56	55	51½		S.	SW.	calm	S.	·038	…	·09	…	48
☽ 20.	30·248	30·239	30·236	29·68	30·20	30·25	60·3	61·2	52·3	73	54	62	55½	48½		S.	E.	SE.	WNW.	…	…	…	…	47
21.	30·188	30·200	30·048	29·68	30·11	30·03	58·2	66·5	55·0	72	42	53·5	47	48½		NW.	NW.	calm	NW.	…	…	…	…	49
22.	30·004	30·169	29·994	29·46	30·15	30·20	50·5	65·3	47·4	55	38	45	49½	45		NW.	N.	N.	ENE.	…	…	…	0·40	45
23.	30·156	30·162	30·048	29·60	30·02	29·89	49·8	58·0	41·6	64	43	49	49	47		NW.	NW.	NE.	NW.	·022	…	·05	…	43
24.	29·946	30·067	29·946	29·36	30·03	30·10	50·3	51·7	45·2	64	36	45	51½	44		NW.	N.	NE.	NNW.	…	…	…	…	43
25.	30·120	30·202	30·096	29·65	30·13	30·12	47·7	52·0	41·7	55	29	48·5	51½	47½		N.	N.	N.	S.	…	…	·07	…	42
26.	30·216	30·226	30·196	29·70	30·13	30·13	48·3	60·3	40·7	66	33	53	50	49		NE.	NE.	calm	S.	…	…	…	…	41
27.	30·230	30·232	30·201	29·73	30·16	30·20	56·3	72·2	45·0	70	40	60	57	53		S.	NE.	calm	SW.	…	…	…	…	43
○ 28.	30·250	30·248	30·227	29·75	30·22	30·26	55·5	66·0	47·2	64	40	49·5	59	55		E.	E.	calm	NE.	…	…	…	…	50
29.	30·212	30·221	30·133	29·68	30·29	30·27	49·4	50·3	41·6	72	46	58	61	45½		NW.	NE.	E.	NE.	…	…	…	0·00	45
30.	30·090	30·095	30·055	29·62	30·25	30·24	53·8	54·5	48·0	72	52	53	52	50		N.	E.	E.	NE.	…	…	…	…	50
31.	30·008	30·010	29·985	29·58	30·19	30·14	56·3	70·2	52·2	68	49	52·5	51½	48		NW.	NE.	NE.	NE.	…	…	…	…	54
Mean.	29·986	30·028	29·928	29·50	29·98	29·99	52·3	60·5	45·0	64·48	40·42	52·	51·1	46·9						Sum. 1·275	·82	0·66	0·70	Mean. 45·3

ANNALS OF NATURAL HISTORY.

XLI.—*The Fauna of Twizell.* By P. J. Selby, Esq., F.R.S.E., F.L.S., &c. &c.

[Continued from the 'Magazine of Zoology and Botany,' vol. ii. p. 387.]

In the 'Magazine of Zoology and Botany' the attention of naturalists was directed to the advantage that the zoology of our own islands could scarcely fail to derive from local Faunas, provided they were undertaken and conducted with accuracy and care; and an attempt was made to point out the precautions necessary to be observed in order to render such Faunas of the greatest possible utility to science. Upon a plan of the kind proposed, the investigation of a small district was undertaken by the writer, and lists of the animals, birds, reptiles and fishes* were given in a second communication in the same work, with a few observations upon the œconomy of such species as seemed to require additional notice. As a continuation of this Fauna may not be altogether useless or devoid of interest to some of the readers of the 'Annals of Natural History,' it is proposed to continue it at intervals so as to embrace the various divisions of the invertebrate animals.

In the present communication catalogues of the coleopterous and lepidopterous insects already found within the precincts of the district subjected to investigation are given; and, as these two divisions have been assiduously attended to for the last three years, it is expected that they contain a great majority of the species inhabiting the district, at the same time the writer is aware that many must have escaped his notice and search, particularly those of minute size, belonging to the *Nitidulidæ*, *Anisotomidæ*, &c., as well as those of rare occurrence in the groups of the *Pselaphidæ*, *Tachyporidæ*, *Stenidæ*, &c. The catalogue of the coleoptera, so far as they have been veri-

* In the list of fishes the eels were omitted; we have the two species *Anguilla acutirostris* and *latirostris*.

fied, enumerates upwards of six hundred species, being in the proportion of nearly one sixth to the whole of the British coleoptera contained in Stephens's Nomenclature, a list of tolerable extent, taking the small size of the district and its northern latitude into consideration. As might be expected, we find the list to be most deficient in those forms whose pabulum either in the larva or perfect state is wanting, or only to be found in very diminished quantity within the district, or in such insects as are restricted within distribution to the southern and warmer parts of the kingdom. Thus of the *Longicornes*, whose food in the larva state consists of wood in progress of decay, we only possess three species, two of which, *Leptura* 4-*fasciata* and *Rhagium inquisitor*, live upon the decayed trunks and roots of the birch, one of our indigenous trees; the other, the *Rhagium bifasciatum*, prefers the rotten fibre of the Scotch fir (*Pinus sylvestris*), though it is sometimes met with in the rotten sap or white wood of the oak. No example of the *Buprestidæ* has yet been detected, and the same may be added in regard to the *Tenebrionidæ*, *Melandryadæ**, *Ædemeridæ*, *Pyrochroidæ*, and a few other families. Of the *Pselaphidæ* only one species has yet been met with; but as the habits of these curious insects are very retired, others in all probability remain to be added, and this we also take to be the case with the *Tachyporidæ*, *Stenidæ*, and *Omalidæ*, in which our list is comparatively very deficient. In the first division, or Geodephagous beetles, we have species of the majority of the genera, and of those that are wanting some are inhabitants of maritime districts, or restricted by something peculiar in their œconomy to confined localities. The same may be said of the Hydradephagous division, as well as of the Phylhydrida and Necrophaga. Of the *Varicornes* or *Helocera*, examples of the genera *Cistela*, *Onthophilus* and *Hister* only have been met with, and among the *Lamellicornes* we possess no representatives of the *Lucanidæ*, *Scarabeoidæ*†, *Trogidæ*, *Dunastydæ* or *Cetoniadæ*‡. Of the *Rhincophoræ* or *Curculionidæ* our

* *Lagria hirta*, belonging to this group, is common upon the coast near Bamburgh.

† *Ægialia globosa* occurs plentifully upon the sea coast.

‡ *Cetonia aurata* has however been met with in nearly the same parallel, having been taken by Dr. Greville in Galloway.

list boasts of a considerable number of generic forms as well as species, and if our researches extended to the coast several others might be added, such as *Cleonus sulcirostris*, *Philopedon geminatus*, and *plumbeus*, *Otiorhynchus tenebricosus*, &c. &c. Few species of the numerous genus *Apion* have been determined, but we have many more which require further investigation and are therefore not included in the list. *Cryptorhynchus Lapathi* has only once occurred, the larvæ were found in the stem of a black poplar, and were first detected by the sawdust produced by the grub, and which was observed protruding from the holes in the bark of the tree. Among the *Bostricidæ* it will be observed that we have several species of the genus *Hylurgus*, and among them *Hyl. piniperda* and *H. ater*, insects which have been considered as very destructive and frequently the cause of the death of the *Pinus sylvestris*. Of the truth of this accusation we from the first entertained doubts, which further observations for several years past have fully confirmed, and we now feel convinced that the *Hylurgus* is not the cause of the decay or death of the plant, but that it is induced to deposit its eggs beneath the bark of the tree in consequence of a prior disease from some other cause, and which has brought it into that condition, in which it becomes the appropriate nidus or breeding receptacle of these insects. I have never found a healthy tree infected or attacked by them in the larva state, every instance having occurred in such as had previously shown decisive indications of ill health and decay, a fact plainly exhibited in the colour of their leaves and stinted growth. That they do some injury in the perfect state by boring into and eating away the internal part of the slender shoots in summer is not denied, but we never met with a plant so severely injured in this way as to be the cause of its death or indeed of any permanent injury. The catalogue of the *Lepidoptera* amounts at present to 370 species and upwards, or full one-fifth of the whole order recorded as British, and we think it not improbable from the number of species, particularly the smaller yet to be added, that the proportion may be increased to a fourth, an amount which would scarcely be expected in so limited a tract of country; had our confines however been extended a few miles further, so as to embrace

the coast and that tract of thin trap formation which prevails to such an extent round Bamburgh and Belford, several additions both of diurnal and nocturnal Lepidoptera might have been added to the list, amongst which may be noted *Sphinx Convolvuli, Hipparchia Semele, Polyommatus Artaxerxes, Agrotis lunigera, Heliothis Peltigera*, &c. Of the *Papilionidæ* it will be observed that *Pap. Machaon, Gonepteryx Rhamni*, the species of the genus *Colias* and *Pieris* do not reach so high a latitude, and the same holds good as to *Vanessa Polychloros* and *Antiopa, Apatura Iris*, and *Limenitis Camilla*. Among the *Nymphalidæ* no instances of *Hipparchia Galathea* and *Tithonus* have been found so far north, and though the *Thecla Rubi* possesses a more extensive geographical distribution, having been found by us upon the confines of Sutherland, it has not been detected in this neighbourhood. Of the beautiful genus *Polyommatus*, *P. Alexis* and *P. Alsus* are the only species found upon Twizell, and *Thymele Tages* (the only example we have of the *Hesperidæ*), though some years abundant, is confined to a particular field, where the *Lotus corniculatus*, the plant upon which the larva subsists, constitutes the principal herbage. Of the *Sphingidæ* we boast of the *Acherontia Atropos* and *Deilephila Galii*, the latter an insect of great rarity even in the south of England. *Deilephila Elpenor* has once occurred, and is one among the very few instances in which it has been met with in so northern a latitude. *Deil. Porcellus* is not uncommon, and it is sometimes bred from the larva which is found feeding upon the *Gallium verum*. The only species of the *Ægeriadæ* is the *Trochilium Crabroniforme*, whose larva is reared in the lower part of the trunks of the *Salix caprea*, and there is scarcely a tree of this species to be found that has not been bored by the caterpillar of this beautiful insect; it is probable also that another species is yet to be detected which breeds in the alder, a common tree upon the margin of our brooks, as specimens have been obtained by Sir William Jardine in Dumfries-shire, from trees on his plantations. Among the *Notodontidæ*, *Pterostoma palpina* and *Notodonta Dromedarius* have but rarely occurred, and the specimens we possess have mostly been reared from the larvæ. *Lasiocampa Rubi* abounds upon the heaths and adjoining

grassy fields, and in some autumns the caterpillars are seen in hundreds feeding upon the heath, willow, &c. It is, however, an insect we have rarely succeeded in rearing from the larva, as in despite of every attention they generally die before assuming the pupa state. The extensive list of the *Noctuidæ*, which amounts to 132 species, is to be attributed to the success which has attended our mode of enticing and securing them during their early nocturnal flight; this is effected by the free use of honey, smeared upon some receptacle which is placed in situations supposed to be favourable to the flight of the moths. An old bee-hive, or as it is called in the north 'a skep', is preferred to any other article, as it offers a larger surface, and from its circular form allows the moths when settled upon it to be easily captured by the flappers. By this device we have sometimes taken several dozen specimens in an evening, many of them considered of great rarity, and which but for this irresistible trap would probably have remained undiscovered; for although we had paid considerable attention to the nocturnal Lepidoptera before this plan was adopted, not a fourth part of the species had been obtained which a single season afterwards brought to light. But besides the certainty of attracting the various species of the *Noctuidæ* and affording in a good season an abundant supply of fine specimens for the cabinet, this plan is attended with other results, interesting as connected with their natural history; thus it shows the periods of duration of the various species, and the apparent influence which season has upon their longevity, as well as the general proportion of the sexes to each other. In summer and the early autumnal months we find that three weeks is about the average duration of a species, reckoning from the first appearance of the insect till it ceases to visit the honeyed skep, and as it does so in all appearance fresh from the chrysalis no mistake can be made. Later in autumn the time becomes extended, and the few species that fly in the milder evenings of the winter months continue to be taken from November to the end of February, as we have captured examples of *Calocampa exoleta*, *Glæa Satellitia* and *Glæa Vaccinii* during all the intermediate months. In March *Orthosia stabilis* appears, and is soon succeeded by *Semiophora gothica* and one or two

others, which continue to the beginning of May, from which period till the 8th or 10th of June very few species of *Noctuideæ* are on wing; but the scene is changed as soon as midsummer approaches, as it is ushered in by a vast variety of forms, which come forth in rapid and daily succession. None of the *Sphingidæ* have yet been attracted by this device, nor have any of the *Bombycidæ* or other groups in which the cibarian organs are small and imperfectly developed been seen upon it. Many of the *Geometridæ* and *Tortricidæ* however have been captured, and among them some of our rarest species. The *Geometridæ* amount to nearly 100 species, and among these will be found several which have been considered as only locally distributed or rare. To this division several additions may be expected to be made, as also to those which follow it, as the same degree of attention has not yet been bestowed upon them which has been given to the larger though not more beautiful or extraordinary forms of these gems of nature.

A List of Coleopterous Insects taken upon the Twizell Estate.

I. Geodephaga.

1. Cicindelidæ.

C. campestris.

2. Brachynidæ.

Dromius linearis.
—— quadrimaculatus.
—— fasciatus.
—— agilis.
—— melanocephalus.

3. Scaritidæ.

Clivina fossor.

4. Carabidæ.

Cychrus rostratus.
Carabus catenulatus.
—— monilis.
—— granulatus.
—— violaceus.
—— hortensis.
—— nitens.
Helobia brevicollis.
—— nivalis *aut* Gyllenhalii.
Leistus fulvibarbis.
—— rufescens.

5. Harpalidæ.

Loricera pilicornis.
Badister bipustulatus.
Anchomenus prasinus.
—— albipes.
Platynus angusticollis.
Agonum parumpunctatum.
—— viduum.
—— versutum.
—— læve.
—— emarginatum.
—— piceum.
Calathus melanocephalus.
—— Cisteloides.
—— mollis.
Argutor pullus.
Pœcilus cupreus.
—— rufifemoratus.
—— versicolor?
Omaseus aterrimus?
—— nigrita.
—— melanarius.
Steropus madidus.
—— Ethiops?
Stomis pumicatus.
Patrobus rufipes.
Platysma niger.
Amara lata.
—— similata.
—— vulgaris.
—— trivialis.
—— plebeia.
—— communis.
—— familiaris.
Bradytus apricarius.
Harpalus rufimanus.

Harpalus limbatus.
—— æneus.
—— ruficornis.
Ophonus puncticollis.
Trechus fulvus.
—— collaris.
—— minutus.
Blemus longicornis.

6. Bembidiadæ.

Tachys binotatus.
—— vittatus ?
—— immunis.
—— biguttatus.
—— Guttula.
Peryphus femoratus.
—— littoralis.
—— viridi-æneus.
—— agilis.
—— tibialis.
Lopha 4-guttata.
Tachypus celer.
—— properans.
—— chalceus.
Bembidium paludosum.

7. Elaphridæ.

Notiophilus aquaticus.
—— biguttatus.
—— palustris.
Elaphrus cupreus.
—— riparius.

II. Hydradephaga.

1. Dytiscidæ.

Haliplus ferrugineus.
—— lineato-collis.
—— ruficollis.
Hygrotus inæqualis ?
—— scitulus.
—— pictus.
Hydroporus frater.
—— depressus.
—— lineatus.
—— dorsalis.
—— 6-pustulatus.
—— deplanatus.
—— melanocephalus.
—— erythrocephalus.
—— flavipes.
—— holosericeus ?
—— pubescens.
—— fuscatus.
—— piceus.
Laccophilus interruptus.
Colymbetes fuscus.
—— guttatus.
—— chalconotus.
—— maculatus.
—— 2-pustulatus.
—— Sturmii.
Ilybius fuliginosus.
—— fenestratus.
Dyticus punctulatus.
Acilius sulcatus.

2. Gyrinidæ.

Gyrinus natator.

3. Parnidæ.

Parnus prolifericornis.

4. Limniidæ.

Elmis Volckmari.
—— tuberculatus.
—— lacustris.
—— parallelipipedus.
—— æneus.

5. Helophoridæ.

Helophorus aquaticus.
—— granularis.
—— griseus.
—— viridicollis.
—— fennicus.
—— nubilus.
Enicocerus viridi-æneus.
—— Gibsoni.
Hydræna riparia.

6. Hydrophilidæ.

Hydrobius fuscipes.
—— chalconotus.
—— orbicularis.
—— 2-punctatus.
—— Colon.
—— minutus.

7. Sphæridiidæ.

Cercyon littorale.
—— apicale.
—— obsoletum.
—— piceum.
—— melanocephalum.
—— conspurcatum.
—— atomarium.
—— convexiusculum.
—— minutum.
—— quisquilium.
Sphæridium scarabæoides.
—— 2-pustulatum.

8. Anisotomidæ.

Leiodes testacea.
—— ferruginea.
—— humeralis.

III. Necrophaga.

1. Scaphidiidæ.

Ptomaphagus truncatus.
Catops fornicatus.
—— chrysomeloides.

Catops Leachii?
Choleva angustata.

2. Silphidæ.

Necrophorus Humator.
—— vestigator.
—— Mortuorum.
—— Vespillo.
Necrodes littoralis.
Oiceoptoma rugosa.
Silpha obscura.
—— tristis.
—— nigrita.
—— opaca.
Phosphuga atrata.

3. Nitidulidæ.

Nitidula discoidea.
—— 2-pustulata.
—— oblonga.
—— æstiva.
Strongylus fervidus.
Campta lutea.
Meligethes viridescens.
—— cœruleus.
—— subrugosus?
—— erythropus.
Cateretes Urticæ.
—— nitidus.
—— pedicularius.
Micropeplus porcatus.
—— tesserula.

4. Engidæ.

Trichopteryx atomaria.
—— pusilla.
—— minuta.
Atomaria castanea.
—— ruficornis.
—— atra.
Typhæa fumata?
Antherophagus pallens.
—— silaceus.
Cryptophagus Populi.
—— humeralis.
—— fumatus.
—— Ulicis.
—— Abietis.
Byturus tomentosus.
Tetratoma Fungorum.
Ips ferruginea.
Rhyzophagus ferrugineus.
—— cylindricus.
—— rufus.
—— dispar.
—— 2-pustulatus.
Silvanus dentatus.
Corticaria crenulata.
Latridius lardarius.
—— transversus.
—— testaceus.
Dermestes vulpinus.

IV. Varicornes.

HELOCERA.

1. Byrrhidæ.

Byrrhus Pilula.
—— sericeus.

2. Histeridæ.

Onthophilus striatus.
Hister unicolor.
—— cadaverinus.
—— carbonarius.
—— nitidulus.

LAMELLICORNES.

1. Geotrupidæ.

Geotrupes sylvaticus.
—— punctato-striatus?
—— stercorarius.

2. Aphodiidæ.

Aphodius Fossor.
—— hæmorrhoidalis.
—— fimetarius.
—— scybalarius.
—— ochraceus.
—— terrestris.
—— rufipes.
—— nigripes.
—— luridus.
—— contaminatus.
—— prodromus.
—— sphacelatus.
—— merdarius.

3. Melolonthidæ.

Serica brunnea.
Melolontha vulgaris.
Phyllopertha horticola.

STERNOXI.

4. Elateridæ.

Cataphagus limbatus.
—— acuminatus.
Dolopius marginatus.
Agriotes sputator.
—— obscurus.
—— lineatus?
Limonius aterrimus.
Hypnoidus riparius.
—— rivularis.
Clenicerus cupreus.
Caloderus Equiseti.
Aplotarsus testaceus.
—— rufipes.
Athöus niger.
—— nigrinus.
—— hæmorrhoidalis.
—— elongatus.
—— subfuscus.
—— vittatus.
—— angularis.
Campylus linearis.

MALACODERMA.

1. Cebrionidæ.

Atopa cervina.

2. Cyphonidæ.

Cyphon melanurus.
—— assimilis.
—— obscurus.
—— marginatus.
—— griseus.
—— immunis.
Lampyris noctiluca.

3. Telephoridæ.

Telephorus ater.
—— flavilabris.
—— testaceus.
—— pallidus.
—— melanurus.
—— pilosus.
—— nigricans.
—— pellucidus.
—— rusticus, —— lividus } one species.
—— lituratus?
—— bicolor.

4. Tillidæ.

Necrobia quadra.

5. Ptinidæ.

Ptinus germanus?
—— 6-punctatus.
—— Fur.
—— crenatus.
Anobium castaneum.
—— striatum.
—— molle.
—— Abietis.
—— Boleti.

6. Bostricidæ.

Hylesinus Fraxini.
Hylurgus piniperda.
—— ater.
—— angustatus.
—— rufus.
—— rhododactylus.

V. Helminthomorpha.

RHINCOPHORA.

1. Curculionidæ.

Cionus Scrophulariæ.
Ceutorhynchus melanocephalus.
—— Geranii.
—— didymus.
—— guttula.
Nedyus assimilis.
—— obstrictus.
—— Erysimi.
—— chloropterus.
—— contractus.
—— floralis.
Nedyus pollinarius.
—— Troglodytes.
Rhinonchus Pericarpius.
Cryptorhynchus Lapathi.
Orchestes Quercus.
—— Calcar.
Tachyerges Saliceti.
Anthonomus fasciatus.
Hydronomus Alismatis.
Grypidius Equiseti.
Erirhinus Arundineti.
Notaris acridulus.
—— 2-maculatus.
Dorytomus Tortrix.
—— melanophthalmus.
—— majalis.
Procas picipes.
Orthochætes setiger.
Hypera punctata.
—— Polygoni.
—— Arator.
—— canescens.
—— picicornis.
—— Pollux.
—— murina.
—— nigrirostris.
—— Plantaginis.
—— hæmorrhoidalis.
—— elongata.
Ellescus 2-punctatus.
Leiosoma punctata.
Hylobius Abietis.
Alophus 3-guttatus.
Barynotus Mercurialis.
Merionus obscurus.
—— elevatus.
Leiophlœus nubilus.
Otiorhynchus sulcatus.
—— notatus.
—— ovatus.
—— tenebricosus.
—— caliginosus.
—— piceus.
—— scabrosus.
—— scabridus.
—— rugicollis.
—— raucus.
Philopedon geminatus.
Strophosomus Coryli.
—— squamulatus.
Sciaphilus muricatus.
Brachysomus hirsutulus.
Sitona Ulicis, —— Spartii, —— femoralis, } one species.
—— hispidula.
—— lineata.
—— grisea?
—— ruficlavis.
—— canina, —— flavescens, —— puncticollis, } one species.

Sitona tibialis.
—— humeralis.
—— Pisi.
—— crinita.
—— lineella.
Polydrusus cervinus.
—— undatus.
Nemoicus oblongus.
Phyllobius Pyri.
—— Alneti.
—— maculicornis.
—— argentatus.
—— Mali.
—— uniformis.
—— parvulus.
—— viridicollis.
Tanymecus palliatus.
Apion Pomonæ.
—— Limonii.
—— Spartii.
—— curtirostre.
—— violaceum.
—— velox.
—— sanguineum.
—— hæmatodes.
—— bifoveolatum.
—— Radiolus.
—— æneum.
—— Pisi.
—— pallipes.
—— flavipes.
—— assimile.
—— æstivum.
—— subsulcatum.
—— punctigerum.
—— vorax.
—— virens.
—— foveolatum.
—— intrusum.
—— nigritarse.
Oxystoma Ulicis.
—— Betulæ.
—— cupreus.
—— curculionoides.

2. Salpingidæ.

Salpingus ruficollis.
—— planirostris.
Sphæriestes ater.

LONGICORNES.

1. Cerambycidæ.

Clytus Arietis.

2. Lepturidæ.

Rhagium inquisitor.
—— bifasciatum.
Leptura 4-fasciata.

VI. Anoplurimorpha.

EUPODA.

1. Criocerida.

Donacia Proteus.
Donacia linearis.
Crioceris cyanella.
—— obscura.
—— melanopa.

CYCLICA.

1. Galerucidæ.

Galeruca Tanaceti.
—— Capreæ.
—— Cratægi.
—— Nympheæ.
—— Calmariensis.
—— Lythri.
—— lineola.
—— tenella.
Luperus rufipes.
—— flavipes.
Haltica Nemorum.
—— nigro-ænea.
—— cærulea.
—— Pseudacori.
—— striatula.
—— brunnicornis.
—— ferruginea.
—— flava.
—— rufipes.
—— Helxines.
—— oleracea.
—— indigacea.
Thyamis tabida.
—— atricilla.
—— picipes.
—— atriceps.
—— Nasturtii.
—— fuscicollis.
—— livida.
—— castanea.
—— læta.
—— parvula.
—— Pulex.
—— Holsatica.
Macrocnema Hyoscyami.
—— Napi.
—— apicalis.
—— picina.
Mantura semi-ænea.
—— ænea.
Chætocnema concinna.
Sphæroderma testacea.
—— Cardui.
Mniophila Muscorum.

2. Chrysomelidæ.

Phædon Armoraciæ.
—— Betulæ.
—— tumidula.
—— aucta.
—— marginella.
—— Vitellinæ.
—— unicolor.
—— Polygoni.
—— fastuosa.

Chrysomela pallida.
—— Litura.
—— marginata.
—— Staphylæa.
—— polita.
Helodes Phellandrii.
—— Beccabungæ.

3. Cassidiidæ.

Cassida rubiginosa.
—— equestris.

TRIMERI.

1. Coccinellidæ.

Chilochorus 2-pustulatus.
Coccinella 12-punctata.
—— 14-punctata.
—— 10-guttata.
—— oblongo-guttata.
—— ocellata.
—— 7-punctata.
—— 22-punctata.
—— variabilis.
—— dispar.
—— 11-punctata.
—— 18-guttata.
—— 13-punctata.
Rhyzobius Litura.
Cacicula pectoralis.
—— scutellata.

2. Endomychidæ.

Endomychus coccineus.

VII. Heteromera.

1. Blapsidæ.

Blaps mortisaga.
Cistela castanea.
—— murina.
—— maura?

2. Mordelidæ.

Anaspis ruficollis.
—— melanopa.
—— pallida.
—— fasciata.

3. Cantharidæ.

Proscarabæus vulgaris.

4. Notoxidæ.

Anthicus fuscus.

VIII. Brachelytra.

1. Tachyporidæ.

Autalia impressa.
Zyras Haworthii?
Bolitochara lunulata.
—— tricolor.
—— nigripalpis.
—— corticalis.
—— nigrofusca.
Bolitochara cinnomomea.
—— atriceps.
Aleochara concolor.
—— 2-punctata.
—— fuscipes.
Megacronus merdarius.
Mycetoporus splendens.
Bolitobius atricapillus.
—— 3-maculatus.
—— apicalis.
—— 2-guttatus.
Tachyporus nitidus.
—— atriceps.
—— nigripennis.
—— chrysomelinus.
—— marginellus.
—— obtusus.
—— analis.
—— marginatus.
—— nitidulus.
—— Hypnorum.
—— lateralis.
Cypha rufipes.
Tachinus Silphoides.
—— collaris.
—— marginellus.
—— brunnipennis.
—— apicalis.
—— rufipes.
—— cinctus.
—— subterraneus.
—— aterrimus.
—— elongatus.

2. Staphylinidæ.

Creophilus maxillosus.
Trichoderma nebulosa.
—— murina.
Staphylinus erythropterus.
—— castanopterus.
—— stercorarius.
—— æriceps.
—— æneocephalus.
—— Cantianus?
Goerius olens.
Ocypus similis.
—— picipes.
—— compressus.
Tasgius rufipes.
Quedius tristis.
—— picicornis.
—— lateralis.
—— hæmopterus.
—— impressus.
—— rufitarsis.
—— piceopennis.
—— caliginosus.
Philonthus laminatus.
—— splendens.
—— æratus.
—— puncticollis.
—— politus.

Philonthus cognatus.
—— melanopterus.
—— microcephalus.
—— maculicornis.
—— decorus.
—— carbonarius.
—— pilipes?
—— chalcopterus.
—— fimetarius.
—— subfuscus.
—— marginatus?
—— varians.
—— intaminatus.
—— rubripennis.
—— sanguinolentus.
—— micans.
—— Watsoni?
—— punctus.
Bisnius cephalotes.
—— rotundiceps.
—— simplex.
Gabrius suaveolens.
—— pygmæus.
—— pallipes.
Othius fulgidus.
—— alternans.
—— glabricornis.
—— angustus.
Gyrohypnus longicollis.
—— cruentatus.
—— affinis.
—— tricolor.
—— linearis.
—— punctulatus.
Gyrohypnus parumpunctatus.
Lathrobium brunnipes.
—— atriceps.
—— rufipenne.
Cryptobium fracticorne.

3. Stenidæ.

Stenus oculatus.
—— nigriclavis.
—— unicolor.
—— picipes.
—— circularis.
—— nitidiusculus.
—— subrugosus.
—— tenuicornis.
—— Aceris.
—— brunnipes.
—— pubescens.
—— punctatissimus.
—— melanarius.
—— nitidus.
—— pusillus.
—— bipunctatus.
Platystethus morsitans.
Oxytelus rugosus.
—— fuscipennis.
—— sculpturatus.
—— depressus.

4. Omalidæ.

Anthobium Sorbi.
—— tectum.
Lesteva caraboides.
—— obscura.
Omalium cæsum.

List of Lepidopterous Insects taken upon the Twizell Estate.

PAPILIONIDÆ.

Pontia Brassicæ.
—— Rapæ.
—— Napi.
—— Sabellicæ.
—— Cardamines.
Argynnis Aglaia.
Vanessa Urticæ.
—— Io.
—— Atalanta.
Cynthia Cardui.
Hipparchia Egeria.
—— Megæra.
—— Janira.
—— Hyperanthus.
—— Pamphilus.
Lycæna Phlæas.
Polyommatus Alexis.
Thymele Tages.

ZYGÆNIDÆ.

Anthrocera Filipendulæ.

SPHINGIDÆ.

Smerinthus Populi.
Acherontia Atropos.
Deilephila Galii.
—— Elphenor.
—— Porcellus.

SESIADÆ.

Macroglossa Stellatarum.

EGERIADÆ.

Trochilium Crabroniforme.

HEPIALIDÆ.

Hepialus Hectus.
—— Lupulinus.
—— Humuli.
—— Velleda.
—— carnus,
—— sylvinus.

NOTODONTIDÆ.

Pygæra bucephala.
Clostera reclusa.
Episema cœruleocephala.
Cerura Vinula.
Notodonta ziczac.

Notodonta Dromedarius.
Leiocampa Dictæa.
Ptilodontis palpina.
Lophopteryx Camelina.

BOMBYCIDÆ.

Saturnia Pavonia.
Lasiocampa Rubi.
—— Roboris.
Eriogaster Lanestris.
Odonestis Potatoria.

ARCTIIDÆ.

Demas Coryli.
Orgyia antiqua.
Lælia Salicis.
Euthemonia Russula.
Arctia Caja.
Nemeophila Plantaginis.
Spilosoma Menthastri.

LITHOSIIDÆ.

Callimorpha Jacobææ.
Lithosia griseola.

NOCTUIDÆ.

Triphæna orbona.
—— subæqua?
—— pronuba *et* innuba (1 species).
—— fimbria.
—— Janthina.
Cerigo texta.
Lytea umbrosa.
Charæas fusca.
—— nigra.
—— graminis.
—— corticea.
—— æqua?
—— segetum.
—— suffusa.
—— sagittifera.
—— vitta.
—— Tritici.
—— Hortorum.
—— nigricans.
—— exclamationis.
Graphiphora pyrophila.
—— Augur.
—— brunnea.
—— baja.
—— festiva.
—— C. nigrum.
—— plecta.
Semiophora Gothica.
Orthosia sparsa.
—— stabilis.
—— miniosa?
—— litura.
—— limosa.
—— lota.
—— flavilinea.
—— macilenta.
Othosia Upsilon.
Mythimna grisea.
—— conigera.
Grammesia trilinea.
—— bilinea.
Segetia Zanthographa.
—— neglecta.
Caradrina Alsines.
—— implexa *et* lævis.
—— Sepii?
—— Cubicularis.
—— superstes.
—— glareosa.
Glæa rubricosa.
—— Vaccinii.
—— spadicea.
—— Satellitia.
Pyrophila Tragopogonis.
—— tetra?
Nænia typica.
Calocampa exoleta.
Xylophasia lithoxylea.
—— sublustris.
—— rurea.
—— polyodon.
—— combusta.
Hadena adusta.
—— satura?
—— remissa.
—— Thalassina.
—— Genistæ.
—— Plebeia.
—— Capsincola.
Heliophobus popularis.
Mamestra Pisi.
—— oleracea.
—— Suasa.
—— Brassicæ.
—— Chenopodii.
Euplexia leucipara.
Hama aliena.
—— basilinea.
Apamea nictitans.
—— secalina.
—— didyma.
—— oculea.
—— I. niger.
—— furca.
—— Ophiogramma.
Miana literosa.
—— strigilis.
—— Æthiops?
—— humeralis.
—— rufuncula.
—— minima.
Scotophila Porphyrea.
Miselia Oxyacanthæ.
—— aprilina.
—— compta.
Polia bimaculosa.
—— occulta.
—— herbida.

Polia Chi.
Acronycta Psi.
—— Menyanthedis.
—— Rumicis.
—— Euphorbiæ ?
Thyatira Batis.
Calyptra libatrix.
Bombycia Viminalis.
Xanthia fulvago.
—— flavago.
—— gilvago.
Gortyna micacea.
Leucania Comma.
—— impura.
—— arcuata.
—— pallens.
—— ochracea.
—— pallida.
—— neurica.
Phlogophora Meticulosa.
Cucullia Tanaceti.
—— lucifuga.
—— Absinthii.
Abrostola Urticæ.
Plusia Iota.
—— percontationis.
—— Gamma.
—— circumflexa ?
—— chrysitis.
—— Festucæ.
Mormo Maura.
Euclidia Mi.
—— glyphica.

GEOMETRIDÆ.

Bupalus Piniarius.
Fidonia atomaria.
—— carbonaria.
Anisopteryx leucophæaria.
Hybernia capreolaria.
Lampetia prosapiaria.
—— defoliaria.
Biston Betularius.
Himera pennaria.
Crocallis elinguaria.
Odontopera bidentaria.
Geometra illunaria.
Rumia Cratægata.
Campæa margaritaria.
Ellopia fasciaria.
Alcis repandaria *et* muraria (1 species.)
Halia Vauaria.
Numeria pulveraria.
Cabera pusaria.
—— rotundaria.
Ephyra pendularia.
Larentia cervinata.
—— Chenopodiata.
—— bipunctaria.
Cidaria Didymata.
—— munitata.
—— unidentaria.
Cidaria latentaria.
—— salicata.
—— Miaria.
—— olivata.
—— montanata.
—— fluctuata.
Harpalyce fulvata.
—— ocellata.
—— tristata.
—— subtristata.
—— biangulata.
—— silaceata.
—— Corylata.
Polyphasia immanata.
—— amœnata.
—— marmorata.
—— concinnata.
—— comma-notata.
—— centum-notata.
Steganolophia Prunata.
Lampropteryx suffumata.
—— badiata.
Anticlea derivata.
Electra comitata.
—— populata.
—— testata.
—— Achatma.
—— Pyraliata.
Anaitis præformata.
Abraxas Grossulariata.
Melanippe hastata.
Zerene rubiginata.
Euthalia miata.
—— Psittacata.
—— impluviata.
—— elutata.
Lozogramma petraria.
Triphosa cinereata.
Camptogramma bilineata.
Chesias Spartiata.
Thera simulata.
—— variata.
—— fulvata.
Oporabia dilutata.
Cheimatobia brumata.
—— rupicapraria.
Eupithecia rectangulata.
—— exiguata.
—— abbreviata.
—— albipunctata.
—— innotata.
Minoa Chærophyllata.
Emmelesia decolorata.
—— rivularia.
—— albulata.
Ptychopoda dilutaria.
—— cinereata.
—— immutata.
Acidalia inornata.
—— aversata.
—— remutata.
—— lactata.

Pœcilophasia marginata.
Macaria liturata.

PLATYPTERICIDÆ.

Cilix impressa.

PYRALIDÆ.

Hypena proboscidalis.
Simaëthis Fabriciana.
Hydrocampa Potomogeta.
Mesographe forficalis.
—— fimbrialis.
—— institialis.
—— sericealis.
—— olivalis.

TORTRICIDÆ.

Hylophila prasinana.
Tortrix viridana.
—— pullidana.
Lozotænia Corylana.
—— lævigana.
—— oporana.
—— Rosana.
—— Holmiana.
Antithesia Betuletana.
Spilonota Cynosbatella.
—— Sylvana.
—— trigeminana.
—— sticticana.
—— quadrana.
Pseudotomia lunulana.
—— aurana.
Steganoptycha cineraria.
Anchylopera Lundana.
—— siculana.
Cnephasia Penziana.
—— interjectana.
Orthotœnia striana.
Sericoris micana.
—— politana.
—— pulchellina.
Pœcilochroma communana.
Lophoderus ministranus.
Peronea variegana.
—— Schalleriana.
—— Gnomana.
Peronea tripunctulana.
Glyphisia effractana.
—— caudana.
Dictyopteryx ciliana.
—— Forskaleana.
Cheimatophila castaneana.
Argyrotoza Conwayana.
—— Daldorfiana.
Argyrolepia Bentleyana.
Xanthosetia Zœgana.
—— Hamana.
—— diversana.

YPONOMEUTIDÆ.

Depressaria Heracleana.
—— gilvella.
—— aplana.
—— Sparmanniana.
—— curvipunctosa.
—— albipunctilla.
—— Alstrœmeriana.
—— costata.
Anacampsis aleella.
Diurnea Fagella.
Yponomeuta Evonymella.
—— comptella.
Argyrosetia Gœdartella.
—— semitestacella.
Argyromiges Rajella.
Œcophora Reesella.
Ilithya sociella.
Eudorea lineola.
—— murana.
Phycita Abietella.
—— hybridalis.
Crambus pratellus.
—— angustellus.
—— horticellus.
—— cespitellus.
—— montanellus.
—— marginellus.
—— culmellus.
—— petrificellus.
—— aquilellus.
Harpipteryx dentella.
Chætochilus vitellus.

[To be continued.]

XLII.—*Descriptions of Exotic Fungi in the collection of* Sir W. J. Hooker, *from Memoirs and Notes of* J. F. Klotzsch, *with Additions and Corrections.* By the Rev. M. J. Berkeley, M.A., F.L.S.

[With a Plate.]

The memoirs on which the present paper is founded appeared in the 'Linnæa,' vol. vii. p. 193, and vol. viii. p. 478*. The

* Mycologische Berichtungen zu der nachgelassenen Sowerbyschen Samm-

notes are appended to the several species in their place in the Herbarium. It seems desirable that the record of so many interesting species existing in a British collection should not be confined to a foreign journal, and there is the greater reason for giving the results of M. Klotzsch's labours in an English form, since the species in the Herbarium, which from its richness and the extreme liberality of its possessor, may almost be regarded as national, appear frequently under perfectly different names, and in some instances the specific names have been transferred from one species to another. I have made corrections where they appeared necessary, and have taken the opportunity of describing some species either received subsequent to the completion of M. Klotzsch's revision or left by him undetermined. It has been thought right to add descriptions of a few of the species collected by M. Humboldt, where the specific phrases given in the 'Synopsis Plantarum æquinoctialium orbis novæ' are too short. It has been found almost impossible to mark the additions which it has been thought right to make in any case to the descriptions already published. I am anxious however to state that I have no wish to rob the learned author of the slightest portion of the praise which is due to his labours, or to put forth his descriptions as my own.

Agaricus.

1. *Agaricus* (*Leucosp. Clit. Rhizop.*) *rheicolor*, Berk. Rhubarb-coloured. Pileus thin, striate, wrinkled in the centre, at length umbilicate; gills rather broad, adnato-decurrent, beautifully connected by strong veins, their bases velvety. Stem long, slender, more or less grooved, slightly thickened at the base, clothed with fine velvety, obscurely fasciculate pubescence.

Pileus scarce 1 inch broad, more or less wrinkled especially in γ centre, as in *Ag. radicatus*, from the contraction of the substance of the pileus; margin grooved and striate. Gills rounded, velvety at the base from running down for a very short distance into the pubescence of the stem, most beau-

lung, so wie zu der wenigen im Linneischen Herbarium vorhandenen Pilzen, nebst Aufstellung einiger ausländischen Gattungen und Arten, 1832.

Fungi exotici e collectionibus Britannorum auctore Klotzsch, 1833.

tifully connected by strong veins, as in the section *Calodontes*. Stem 3 inches high, about two lines thick.

Apparently nearly related to *A. velutipes*, but I believe truly distinct. The stem is not always rooting, but neither is this constantly the case in that species.

On trunks of trees. Brazil. Hook. Herb.

2. *Agaricus* (*Leucosp. Myc. Hygrocyb.* (*Leuc. Omph. Myc. Kl.*)) *umbraculum*, Kl. in Linn. vol. viii. p. 478. *Ag.* (*Collybia*) *umbraculatus*, Kl. in Hook. Herb.

Fasciculate. Pileus convex, umbilicate, slightly striate, membranaceous, somewhat tawny (*fuscescente-albo*, Kl.); gills when dry tan-coloured decurrent; stem fistulose, bay, extremely viscid, confluent at the base and blackish.

Stem 2—$2\frac{1}{2}$ inches high, even. Pileus submembranaceous, 3—4 lin. broad, tough. Gills rather distant, sometimes dichotomous near the margin.

On trunks of trees. Mauritius. Mr. Telfair.

This species belongs clearly, as to habit, to the section *Hygrocyboideæ* of the subgenus *Mycena*. M. Klotzsch appears not to have suspected this and therefore did not moisten the stem, which drips when wet with pellucid slime like *Ag. roridus*. The pileus has rather a tawny than fuscous hue; the gills in the recent plant are probably nearly white. It appears very nearly allied to *Ag. roridus*, *β. stillans*.

3. *A.* (*Omphalia*) *strigellus*, Berk. Pileus tough, entire, infundibuliform, red-brown, sprinkled, especially towards the margin with minute setulose scales; margin slightly waved, thin, subinvolute. Gills narrow, decurrent, entire, scarcely anastomosing at the base. Stem short, clothed with coarse, velvety, fawn-coloured pubescence.

Pileus $2\frac{1}{2}$ inches broad, nearly of the same colour as *Ag. vaccinus*, apparently very obscurely zoned; gills crisp when dry and wood-coloured, running down till they are lost amongst the down of the stem. Stem 1 inch high, $\frac{1}{3}$ thick, rather swollen at the base. This species appears to be nearly allied to *Ag. velutinus*, Fr. in Linn., and for the same reason is placed in the subgenus *Omphalia*, though its affinities are with *Pleuropus*. The gills are crisp when dry and entire; the habit too removes it from *Lentinus*.

On trunks of trees. Brazil. Hook. Herb.

4. *A.* (*Pleur. Conch.*) *pycnoticus,* Kl. l. c. p. 479. *A. pycnosus,* Kl. in Hook. Herb. Cæspitose. Pileus entire, pulvinate, subinfundibuliform, excentric, reddish in consequence of being frosted with a grey-lilac bloom. Gills broad, dirty white, decurrent. Stem smooth.

Substance extremely tough. Stem dirty white. Pil. 1—2 inches broad, smooth. Gills entire.

On trunks of trees. Mauritius. Mr. Telfair. One specimen in the herbarium exceeds the above dimensions, the pileus when expanded being more than three inches across. The stem in this is scarcely half an inch thick, and indeed in any case can scarcely be called thick in proportion to the pileus. The colours in the specific character are to be understood of the dry plant. The grey-lilac bloom is very remarkable.

Lentinus.

1. *L.* (*Mesop.*) *nigripes,* Fr. in Litt. Kl. l. c. p. 479. *L. Bertieri,* Kl. in Hook. Herb. *L. villosus,* Kl. in Hook. Herb. Cervino-ferruginous; pileus coriaceous, infundibuliform, clothed with curled hairs; gills denticulate, terminating together; stem firm, solid, tomentose, blackish at the base. Solitary; stem almost 2 inches high, 2 lines thick, dilated above. Gills crowded, narrow, denticulate. Pileus 2 inches broad, deeply umbilicate; margin involute.

On trunks of trees. Mauritius. Mr. Telfair. Brazil, Guiana.

2. *L.* (*Mesop.*) *villosus,* Kl. l. c. Brown; pileus coriaceous, infundibuliform, clothed with very dense straight hairs; gills narrow, entire, very distant, decurrent, all ending together abruptly; stem firm, villous, dilated at the apex. Stem hirsute, 2 inches high, 3—4 lines thick. Pileus 2 inches broad with the margin involute, clothed with straight, not squarrose, nor curled hairs.

On trunks of trees. Mauritius. Mr. Telfair.

3. *L.* (*Mesop.*) *stupeus,* Kl. l. c. p. 480. Bay; pileus deeply umbilicate, clothed with very crowded squarrose hairs; margin involute; gills crowded, denticulate, decurrent, all interrupted

together; stem slender, subtomentose, fawn-coloured, with longer bay hairs intermixed.

Pileus 2 inches broad, squamuloso-pilose. Stem scarcely exceeding 1 line in thickness, very much dilated above, in age quite smooth.

On trunks of trees. Mauritius. Mr. Telfair.

4. *L.* (*Mesop.*) *crinitus*, Fr. Syst. Myc. vol. i. p. 175.

On trunks of trees. Mauritius. Mr. Telfair.

5. *L. exilis*, Kl. MSS. in Hook. Herb. Pileus thin, of a tough fleshy substance, smooth, ochraceous-tawny; gills equal, decurrent, distinct, entire; stem even, smooth. Pil. 2—4 inches broad, margin lobed. Gills crowded. Stem $\frac{1}{2}$ an inch high; 3—4 lines thick.

On rotten wood. Mauritius. Mr. Telfair.

Favolus.

1. *F.* (*Pleuropus*) *Humboldtii*, Berk. Stem short, lateral, gradually expanding into the thin, obovate, somewhat lobed, smooth, tawny, pileus; alveoli small, elongated, of the same colour as the pileus; dissepiments thin. Pileus with the stem $1\frac{3}{4}$ inch long, $1\frac{1}{2}$ inch broad, with three rounded lobes. Stem not $\frac{1}{2}$ an inch long.

The specimen from which the above character is drawn up is clearly a *Favolus*, but it is unfortunately not in a good state of preservation. It is marked in Sir W. J. Hooker's Herbarium, Humb. No. 179. The alveoli are far smaller than in either of the two following species, to which it is closely allied. In form and colour it is much like *Favolus braziliensis*, Fr., which however differs in several respects. From *F. flaccidus* it differs in being stipitate, and from *F. tenuicaulis* in not being reniform.

2. *F.* (*Pleuropus*) *hepaticus*, Kl. in Linn. vol. vii. p. 197. Of a tough fleshy substance; pileus reniform, liver-coloured, smooth, lobed in free-growing specimens; stem extremely short, lateral; alveoli 6—4-angled, elongated, dirty white; dissepiments very thin. *Favolus canadensis* and *Polyporus cellulosus*, Kl. in Hook. Herb.

Solitary, variable but more or less reniform. The colour of the pileus is darker towards the base. Pil. 2—5 inches broad, $1\frac{1}{2}$—3 inches long, smooth. Stem very short, 3 lines thick.

Alveoli 1 line broad, 2 lines long, 2—3 lines deep. The most obvious mark of distinction between this and the following species resides in the less rigid dissepiments. I think it very doubtful whether the living plant is at all liver-coloured. I suspect it is rather ochraceous.

Mauritius. Mr. Telfair.

3. *F.* (*Pleuropus*) *canadensis*, Kl. l. c. Nearly sessile, with only the rudiment of a stem, of a tough, fleshy substance, rigid; pileus reniform, at first minutely squamose, tawny; margin entire; alveoli deep, 6-sided, elongated, dirty white; dissepiments rigid. Pileus $1\frac{1}{2}$ inch broad, $\frac{5}{8}$ inch long.

Canada. Messrs. Shepherd and Pursh.

Cantharellus.

C. (*Mesopus*) *canadensis*, Kl. MSS. in Hook. Herb. Pileus, together with the stem, turbinate, fleshy, smooth, even, white, deeply infundibuliform; folds forming elongated alveoli, dichotomous above; stem confluent with the pileus, compact, smooth. Pileus nearly 2 inches high, $\frac{1}{2}$ an inch thick.

Canada. Hook. Herb.

It is impossible to say what the colour of the folds may have been in the fresh plant. When dry the pileus is pallid; the folds are darker and run for some distance down the stem. The nearest affinities of this species appear to be with *C. clavatus*. If it were not so much depressed it would form an addition to the section *Gomphus*.

Dædalea.

1. *D.* (*Pleuropus*) *lævis*, Hook. in Kunth. Syn. vol. i. p. 9. Stem short, thick, lateral. Pileus thin, suberoso-coriaceous, expanded, reniform, emarginate, quite smooth, zoneless, even; margin acute. Gills broader than the flesh, straight, extremely close, anastomosing. Stem $\frac{3}{4}$ of an inch long, and broad. Pileus $1\frac{3}{4}$ inch long, $2\frac{1}{2}$ inches broad, scarce $\frac{1}{8}$ of an inch thick. Sinuli mostly linear. Colour in the dry plant yellow brown, in the fresh plant it is probably pallid ochraceous.

Andes, between Popayan and Almaguer. Humboldt, Hook. Herb. Specimen unicum. Allied to *D. applanata*, Kl., and *D. polita*, Fr. in Linn.

2. *D.* (*Apus*) *betulina, var. velutina,* Berk. Pileus hard, sessile, dimidiate, lobed, deeply zoned, tawny, velvety. Gills rather thick.

New Orleans and other parts of North America, Hook. Herb. The pileus is by no means tomentose, but clothed with short close velvety pubescence. Vertex sometimes lengthened out into a sort of stem. *Thelephora lobata* varies in the same way.

3. *D.* (*Apus*) *aspera,* Kl. in Linn. vol. viii. p. 480. Pileus sessile, dimidiate, coriaceous, zoned, rough, pale; gills very broad, white, straight, with shorter ones intermixed. Pileus horizontal or somewhat pulvinate, obsoletely downy, 3 inches broad, $2\frac{1}{2}$ inches long. Gills coriaceous, thin, distant, 1 inch broad towards the base, narrower in front, rarely anastomosing.

On trunks of trees. Mauritius. Mr. Telfair.

β. alutacea, Kl. in Hook. Herb. Darker; gills thick, frequently anastomosing.

Mauritius. Mr. Telfair.

4. *D.* (*Apus*) *applanata,* Kl. l. c. p. 481. Stem central, lateral, or altogether wanting; pileus rather thin, reniform, smooth, dirty white, sometimes papillate; margin somewhat zoned; gills dirty white, very narrow, close, repeatedly dichotomous, anastomosing towards the base.

D. applanata, Fr. in Hb. Willd. an *D. polita,* Fr. in Linn. vol. v. p. 514? *D. candida,* Kl. MSS. in Hook. Herb. Size very variable. Pileus thin, 16 inches broad, generally plane, rarely imbricated. Margin thin, straight, substance coriaceo-suberose.

On trunks of trees. Mauritius. Mr. Telfair. Brazil. This species has very much the habit of *Dædalea gibbosa,* Fr.

5. *D.* (*Apus*) *sanguinea,* Kl. l. c. Pileus thin, slightly wrinkled, smooth, zoned, blood-coloured; margin obtuse, pale, minutely velvety; hymenium dull wood-coloured; sinuli minute, labyrinthiform, mixed with elongated pores. Substance coriaceous. Pileus subreniform, sometimes spotted and losing its colour, 3 inches broad, 2 inches long. Sinuli towards the margin poriform.

East Indies. Dr. Wight.

Klotzsch does not seem to have noticed the extremely strong

resemblance of this species to *Boletus angustatus*, Sow., t. 193. whose figure would be an excellent representation of it in every respect if the pores were smaller. Fries's character of *Dædalea angustata* conveys an entirely wrong notion of the species, which is one of the most beautiful of European Fungi. The colour is not, as characterized by Fries, who had only seen the figure, "fuscescenti-cinereus," but as figured and described by Sowerby, "dull crimson, somewhat satiny on the edges, which are of a silvery brown."

6. *D.* (*Apus*) *discolor*, Fr. El. Fung. p. 68. *D. albida*, Schwein. Car. n. 851.

On trunks of birch. North America. Dr. Richardson.

7. *D.* (*Apus*) *striata*, Fr. Syst. Myc. i. p. 334.

On trunks of trees. North America. Hook. Herb.

8. *D.* (*Apus*) *unicolor*, Fr. Syst. Myc. i. p. 336.

On trunks of trees. North America. Dr. Richardson*.

9. *D.* (*Apus*) *corrugata*, Kl. l. c. Pileus carnoso-coriaceous, zoned, longitudinally corrugate, smooth, pale; sinuli unequal, flexuous, at length torn, brownish. Imbricated, sessile. Pileus 1—2 inches broad, margin much dilated, 2—3 lines thick; zones of the same colour. Gills thin, labyrinthiform, poriform near the margin.

Trunks of trees. North America. Dr. Richardson.

10. *D.* (*Resup.*) *latissima*, Fr. Syst. Myc. i. p. 340.

D. microsinulosa, Kl. MSS. in Hook. Herb. Wood-coloured, effused, corky, margin obscurely lobed, minutely byssoid, more or less free; silky above, at length nearly smooth, rather rough with radiating branched raised lines. Pores at first round, at length sinuous; edges entire.

East Indies. Dr. Wight.

Forming elongated effused patches, evidently arising from many distinct confluent peltate individuals. A new layer is formed from the dead subjacent plant.

Polyporus.

1. *P.* (*Favolus*) *tenuis*, Hook. sub Bol. Kunth. Syn. vol. i. p. 10. *Bol. reticulatus*, l. c. p. 9. *B. Favus*, Linn. Herb. not

* The Fungi from Dr. Richardson are the result of his own and Mr. Drummond's labours in Franklin's Second Journey to the Polar Sea.

of Spec. Plant. Effuso-reflexed or resupinato-affixed. Pileus 2—3 inches in diameter, suberoso-coriaceous, suborbicular, zoned, quite smooth, sometimes longitudinally rugulose, thin, greyish wood-coloured, blackish towards the margin. Pores cinereous, 6-sided, those towards the margin imperfect and pale.

Andes between Popayan and Almaguer, Humboldt. Mauritius, Mr. Telfair. Calcutta, Dr. Wight.

Klotzsch has very rightly referred *Bol. reticulatus*, Hook., to this species. The reticulated appearance arises from the specimen having been accidentally reversed, and in consequence a new hymenium is in the act of formation on the pileus, while on the other hand many of the pores are stopped up with a new incipient pileus. The plant from Calcutta is somewhat different, the pileus being dark brown. The size of the pores is very variable.

2. *P.* (*Favolus*) *Klotzschii*, Berk., *P. sinensis*, Kl. l. c. and MSS. Hook. Herb. not Fr. Syst. Myc. Pileus subreniform, zoned, brown black, clothed with compressed branched bristles, pores brown, rather large, rotundato-hexagonal. Allied to *Polyporus hynoideus*, but differs in the larger hexagonal pores, which are however many times smaller than in the next species. The vertex is sometimes lengthened out into a short spurious stem. Pileus 5 inches long, 7 inches broad, $\frac{1}{2}$—$\frac{3}{4}$ of an inch thick at the base, thin in front, vaulted, not flattened as in the next species, margin acute. Much more strongly zoned than *Pol. sinensis*, Fr., and more hispid.

Mauritius. Mr. Telfair.

3. *P.* (*Favolus*) *sinensis*, Fr., *Pol.* (*Scenidium*) *Wightii*, Kl. Linn. vol. vii. p. 200. tab. 10. Sessile, thin, mostly reniform; pileus flat, brown shaded with reddish-grey; margin zoned; bristles compressed, dichotomous at their apices, fastigiate, brown; alveoli 6-sided, elongated, pinkish-brown. Pileus sometimes effused at the base, $2\frac{1}{2}$ inches long, 5 inches broad, emarginate, in an early stage of growth crested with the rigid recurved bristles; these at length are more scattered, compressed, wedge-shaped, or palmate, incised above, fastigiate, brown, vanishing towards the margin. Alveoli 3 lines long, 2 lines broad, those in the centre deepest, shallow towards the

margin; dissepiments thin, very rigid, clothed with scattered solitary bristles. Substance brown, ferruginous, fit for tinder.

East Indies. Dr. Wight.

This is probably the true *Pol. sinensis*, Fr., and consequently *Pol. Favus*, Linn. Sp. Pl. It is certainly quite distinct from the foregoing, which is marked *Pol. sinensis* in Sir W. J. Hooker's Herbarium, and is published under that name in the 'Linnæa,' having, besides other points, the pores nearly ten times larger. As *Scenidium* of Klotzsch appears to be intended merely as the name of a tribe, the name of *sinensis* should have been retained. In the following year the *Mauritius* plant was published as the *P. sinensis*, Fr. without any reference to *P. Wightii*. I have endeavoured to do away with the consequent confusion by giving the former the name of the learned German mycologist.

4. *P.* (*Favolus*) *sericeo-hirsutus*, Kl., Linn. vol. viii. p. 483. Pileus effuso-reflexed, very thin, coriaceous, sericeo-villous, zoned, pale tawny; pores rather large, angular, unequal; dissepiments very thin, sometimes torn. Pileus very often fixed by the centre, 2—3 inches across, suborbicular, emarginate. Perfectly free specimens are beautifully sericeo-strigose, with the flocci more or less matted and fasciculate, so as to give it a shaggy appearance. Some specimens are merely velvety.

On bark. New Orleans. Hook. Herb.

5. *P.* (*Mesopus*) *gracilis*, Kl. in Hook. Herb. Small. Pileus carnoso-coriaceous, orbicular, very thin, quite smooth, even, pallid; pores extremely minute, suborbicular but more or less sinuous; stem exactly central, very slender, flexuous, equal, pruinose. Pileus $\frac{1}{2}$ an inch broad, so thin that the pores are visible through it, pale dull ochre. Pores deep in proportion to the thickness of the pileus; dissepiments thin, waved. Stem 1 inch high, $\frac{1}{30}$th of an inch thick.

India Occid. Probably from Rev. L. Guilding. Allied to *Pol. flexipes*, Fr. in Linn. The above description is drawn up from two individuals in Sir W. J. Hooker's Herbarium, marked by Klotzsch *P. gracilis*, Kl. The base of the stem is broken off, therefore I cannot state whether it is blackened.

6. *P.* (*Mesopus*) *parvulus*, Kl. Linn. l. c. Pileus thin, coriaceous, obsoletely silky, obscurely zoned, striato-rugose;

margin jagged; pores rather large, at length torn, cinnamon; stem cinnamon, slender, subtuberous, velvety. Pileus 4—8 lines broad, deeply umbilicate, subcyathiform, shining, sometimes confluent. Pores irregular, angular, torn, very shallow towards the margin; dissepiments very thin. Stem $\frac{1}{2}$—1 inch high.

Amongst moss. North America. Dr. Richardson. Allied to *Pol. perennis*, but very distinct.

7. *P.* (*Mesopus*) *perennis*, Fr. *var. canadensis*, Kl. in Hook. Herb. Deeply infundibuliform, zoneless.

8. *P.* (*Mesopus*) *umbraculum*, Fr. Mauritius. Mr. Telfair.

9. *P.* (*Mesopus*) *xanthopus*, Fr. *Bol. Katui*, Ehr. Hor. Phys. Ber. t. 19. f. 12. Hook. in Kunth. Syn. vol. i. p. 9.

East Indies, Dr. Wight. Near Acapulco, Humboldt.

10. *P.* (*Pleuropus*) *spathulatus*, Hook. in Kunth. Syn. vol. i. p. 9. sub *Boleto*; small, tawny. Pileus convex, broadly obovate, coriaceous, rather hard, minutely velvety; pores minute, punctiform, subangular; dissepiments extremely thin, their borders minutely downy; stem lateral, velvety, rather stout, elongated. Pileus about 3 lines broad, sometimes very obsoletely zoned, in one specimen lobed from the confluence of two individuals. Stem $\frac{1}{8}$—$\frac{5}{8}$ of an inch high, $\frac{1}{8}$ thick, clothed with a dense spongy down.

Near Loxa in Peru. Humboldt. Resembling in colour and substance *Pol. perennis*.

11. *Pol.* (*Pleuropus*) *coffeatus*, Berk. Cæspitose. Pileus hard, corky, suborbicular, oblique, even, dingy red-brown; margin paler, tawny; substance wood-coloured; pores minute, punctiform, dirty white; stem elongated, nearly even, dingy brown frosted with coffee-coloured bloom. Pileus $\frac{3}{4}$ of an inch broad, not lacquered, at least in the specimens before me. Stem $2\frac{1}{2}$ inches high, $\frac{3}{8}$ of an inch thick, lateral. Hymenium decurrent.

On rotten trees, rare. St. Vincent's. Rev. L. Guilding.

The specimen before me consists of a group of three, of which the larger pileus is unfortunately broken off.

12. *P.* (*Pleuropus*) *lucidus*, Fr. Mauritius. Mr. Telfair. Confluent, umbilicate, concentrically undulato-rugose, with the stem central, resembling in habit *Polyp. rugosus*, Nees, but

much larger and thicker. Pores more or less yellow. In Sir W. J. Hooker's Herbarium there is a curious stemless ungulate pitch black variety with brownish pores gathered in North America by Dr. Scouler. Dr. Richardson also gathered an extraordinary form at the Slave Lake on the white spruce $4\frac{1}{2}$ inches long, 7 inches broad, $2\frac{1}{2}$ inches thick at the base, entirely stemless, decurrent at the base, with a strongly raised convex border. Surface veiny, varnished; the older portions dull and slightly cracked. Substance, hard, corky, pale, not at all red. Pores very minute, dirty white.

13. *P.* (*Pleuropus*) *Amboinensis*, Fr. Mauritius. Mr. Telfair. Some states of this species approach so near to *P. lucidus* that it is difficult sometimes to believe it distinct. There are specimens in Sir W. J. Hooker's Herbarium almost exactly intermediate.

14. *P.* (*Pleuropus*) *flabelliformis*, Kl. l. c. Pileus rigid, thin, obsoletely tomentose, zoned, tawny-bay, at length blackish; margin acute; pores extremely minute, dirty white; stem very short. Pilei 2—4 inches broad, sometimes laterally connate, flabelliform, coriaceous-rigid, elegantly zoned, the interstices coarsely velvety, emarginate, plane or depressed, very variable in colour, generally brown variegated with chestnut. Hymenium pale tan. Pores perfectly round or elliptic. Stem abruptly black at the base, where it is sometimes dilated.

Mauritius, where it appears to be a common species. Mr. Telfair. Analogous to *Pol. versicolor*.

15. *P.* (*Merisma*) *discolor*, Kl. l. c. Imbricated, confluent, subsessile. Pilei flabelliform, connate at the base, longitudinally rugulose, plicate, lobed, dirty white; pores brown-olive, plane, extremely minute, subrotund, sometimes torn. Substance fleshy, white, when brittle old. Pilei irregular, lobed, growing together at the base, longitudinally rugose, 3—6 inches broad.

On trunks of trees. Mauritius. Mr. Telfair.

16. *P.* (*Merisma*) *Telfairii*, Kl. l. c. p. 484. Imbricated, confluent, sessile; pilei minutely tuberculoso-rugose, obsoletely zoned, white, subpubescent; pores minute, plane, somewhat toothed, of the same colour. Substance carnoso-coriaceous. Pilei subpubescent, sometimes sericeo-striate and shi-

ning, densely imbricated, lobed, thin, 2—3 inches broad, 1 inch long, white or wood-coloured; dissepiments extremely thin. Pores sometimes strongly toothed. Margin sometimes very thin, torn, and inflexed when dry.

Trunks of trees. Mauritius. Mr. Telfair.

17. *P.* (*Merisma*) *cristula,* Kl. in Hook. Herb. Dull vermilion, imbricated, confluent, coriaceous. Pilei zoned towards the margin, irregular, smooth. Pores shallow, minute, irregular, angular, dissepiments thin, torn. Pilei confluent, ¾—1 inch broad, their disk crested with numerous smaller pilei, many of which are cylindrical and abortive; margin thin, acute, barren. Pores of the smaller pilei decomposed into hydnoid bristles, so that some parts of the mass appear bristly. Substance firm with a slight ferruginous tinge.

On decaying Bamboo. Dr. Wight. Allied to *Pol. cinnabarinus,* which does not appear to occur in the tropics. The colour however is much duller.

18. *P.* (*Apus. Perenn.*) *ligneus,* Berk. Wood-coloured. Pileus convex, ungulate, hard, ponderous, rugose, zoned; hymenium narrower with age; pores extremely minute, round. Pileus 3¾ inches long, 5¼ inches broad, 2⅓ inches thick. Substance wood-coloured, very hard, but velvety like cork. Marginal zones very narrow; those in the centre about three, much raised, brown. Hymenium becoming narrower every year. Sometimes cylindrical from the elongation of the vertex.

St. Vincent's, Rev. L. Guilding. Mauritius, Mr. Telfair.

19. *P.* (*Apus. Perenn*) *australis,* Fr. *P. fomentarius, β. applanatus,* Kl. in Hook. Herb.

Mauritius. Mr. Telfair. A very extraordinary fungus occurs in Mauritius which I think is clearly referable to this species. It is furnished with a long lateral stem. Pileus much longer than broad. Hymenium narrow with a broad sulcate sterile border. Pores pale. Some specimens are altogether stipitiform, pointed with an oblique abortive hymenium. I have gathered *Polyporus fomentarius* more than once with a long, distinct, lateral stem. Plate VIII.

20. *P.* (*Apus. Perenn.*) *fomentarius,* Fr. North America. Dr. Richardson.

Var. excavatus, Berk. Hard, ungulate. Hymenium hol-

lowed out. Pileus 1½ inch across, 1½ high, dirty white, banded with brown; bands scarcely at all depressed, quite smooth, nearly even. Margin rather obtuse. Pores small, perfectly round, fawn-coloured, cinnamon within. Old specimens have four or five smooth, even, convex, black-brown ridges. Substance cinnamon coloured.

On birch. Isle à la Crosse. Dr. Richardson.

21. *P.* (*Apus. Perenn.*) *nigricans*, Fr. On dead birch. Isle à la Crosse, Jan. 1827. Dr. Richardson.

22. *P.* (*Apus. Perenn.*) *igniarius*, Fr. On birch. North America. Dr. Richardson.

A resupinate state of this species with a very narrow dark border was found April 1830, by Bertero in Juan Fernandez, marked No. 1682.

23. *P.* (*Apus. Perenn.*) *pectinatus*, Kl. l. c. p. 485. Small. Pileus triquetrous, imbricated, bay, crested with concentric thin velvety folds; pores short, minute, yellow. *Pol. indicus*, Kl. MSS. in Hook. Herb. Pileus effused at the base, scarce one inch broad. Substance of the colour of turmeric. The folds arise from the successive reflexed borders of the pileus, calling to mind *Cytherea Dione*.

East Indies. Dr. Wight. Nearly allied to the last.

24. *P.* (*Apus. Perenn.*) *spadiceus*, Berk. Hard, coriaceo-suberose. Pileus thin, bright brown, minutely velvety, closely zoned. Hymenium ferruginous-cinnamon; pores very minute, subrotund, cinnamon within. Pileus 1¼ inch long, 2½ inches broad. Substance rhubarb-coloured. A very neat species, resembling *P. tabacinus*. Allied to the last.

East Indies. Dr. Wight.

25. *P.* (*Apus. Perenn.*) *rhabarbarinus*, Berk. Horizontal, heavy, hard. Pileus flattened, broad, rugose, deeply and repeatedly zoned, black-brown, almost lacquered. Hymenium cinnamon-brown. Pores round, extremely minute, almost invisible to the naked eye. Substance rhubarb-coloured. Pileus 5 inches long, 8 inches broad, ¾ of an inch thick. There is a rudiment of a lateral stem. The species is clearly related to *P. igniarius*. This fine species has unfortunately no label attached to it. It is probably from Brazil.

26. *P.* (*Apus. Perenn.*) *sanguinarius*, Kl. l. c. p. 484. Corky,

hard. Pileus thin, sometimes papillose, brown-blood-coloured, at length pale, effused at the base; pores extremely minute, pale, with a brownish tinge. Very like *P. igniarius*. Pileus effuso-reflexed, rather thin, zoneless, tuberculated, smooth, margin subacute, brown-blood-coloured, 3—4 inches broad.

Mauritius, Mr. Telfair. Of this I have seen no specimens.

27. *P.* (*Apus. Perenn.*) *marginatus*, Fr. On birch. North America. Dr. Richardson.

28. *P.* (*Apus. Perenn.*) *fraxineus*, Fr. On ash. North America. Dr. Richardson.

29. *P.* (*Apus. Perenn.*) *hydnoides*, Fr. *Pol. ursinus*, *P. vulpinus*, Link in Berl. Mag.

Mauritius, Mr. Telfair. St. Vincent's, Rev. L. Guilding, Demerara, Mr. Parker. The hymenium of this species varies very much. The pores are sometimes close and angular with thin dissepiments; sometimes they are perfectly round and distant as represented by Bosc under *Bol. hydnatinus*, with the dissepiments thicker in consequence of the cellular substance of the fungus beginning to grow again after the perfection of the hymenium, and thus partially obliterating the pores. There is a triquetrous variety from Brazil.

30. *P.* (*Apus. Perenn.*) *fibrosus*, Hook. in Kunth. Syn. vol. i. p. 10. sub *Boleto*. Subreniform, somewhat lobed, undulated. Pileus brown shaded with reddish-grey, zoned, clothed with scattered branched concentrically disposed fibres, sericeous beneath; margin very thin, acute, fimbriated; pores minute, subangular, umber; dissepiments very thin. Pileus $1\frac{3}{4}$ of an inch long, $3\frac{1}{2}$ broad, flattened, thin; substance much softer than in the last, which is hard and woody, ferruginous-umber. Pores not stratose. Certainly distinct from the foregoing. This is placed next to *P. hydnoides* on account of its close affinity, but I doubt whether either is truly perennial. With *P. tenuis*, Humboldt. Demerara, Mr. Parker.

31. *P.* (*Apus. Bienn.*) *gilvus*, Fr. Suberoso-coriaceous. Pileus reniform, obscurely zoned, rugoso-striate, subsericeous, red grey; substance rhubarb-coloured; pores small, subferruginous.

Var. *scabro-rugosus*, Berk. Imbricated; pileus dimidiate, more or less zoned, radiato-rugose and coarsely scabrous, red-

dish-grey, here and there ferruginous; substance rhubarb-coloured; pores small, greyish-umber. Pilei $\frac{1}{2}$—$\frac{3}{4}$ of an inch thick, 4 inches broad, $2\frac{1}{2}$ inches long, suberoso-coriaceous, wrinkled, coarsely scabrous, in parts as if overgrown with a small *Isidium*, reddish-grey; margin paler; extreme margin and base sometimes ferruginous.

New Orleans. I have drawn up a character for *P. gilvus*, from an original specimen of Schweinitz, as Fries's specimens appear to have been very imperfect. The New Orleans plant is certainly the same as the Pennsylvanian, but it acquires a much larger size.

32. *P.* (*Apus. Bienn.*) *calvescens*, Berk. Fawn-coloured, rather thin, hard, suberoso-coriaceous. Pileus dimidiate, subimbricate, rather rugged, older part naked; border bright zoned, beautifully velvety. Hymenium uneven; pores rather minute, angular, dissepiments thin; margin abruptly barren.

New Orleans. Pileus $1\frac{1}{2}$ inch long, $2\frac{1}{2}$ inches broad. Allied to the foregoing.

33. *P.* (*Apus. Bienn.*) *cinnabarinus*, Fr. Carlton House. North America. Dr. Richardson.

34. *P.* (*Apus. Bienn.*) *ulmarius*, Fr. North America. Dr. Richardson.

35. *P.* (*Apus. Ann. Suberosi*) *suaveolens*, Fr. North America. Mr. Drummond in Capt. Franklin's expedition.

36. *P.* (*Apus. Ann. Suberosi*) *obtusus*, Berk. Pileus thick, pulvinate, fleshy, spongy, soft, tomentose, white; margin very obtuse; pores unequal, rather large, irregular, subgyrose, tawny when dry. *Pol. Drummondii*, Kl. MSS. in Hook. Herb. Pileus 4—6 inches across, 2 inches thick at the base, minutely tomentose; substance soft but tough, white. Hymenium rather convex; dissepiments jagged, often projecting like teeth; pores very unequal, $\frac{3}{4}$ line broad, 1 inch deep. Allied to *Pol. suaveolens*, but the habit is different, and the pores much larger and more irregular, and the substance denser.

North America. Mr. Drummond.

37. *P.* (*Apus. Ann. Sub.*) *leoninus*, Kl. l. c. p. 486. Pileus effuso-reflexed, fleshy, spongy, fibroso-hairy, tawny; pores rather large, deeply jagged and sinuated, dissepiments deeply toothed. Pileus effused for several inches, zoneless, clothed

with dense strigose tawny pubescence. Pores brownish, with large acuminate teeth, giving the hymenium an hydnoid appearance.

East Indies. Dr. Wight. It is allied to *Pol. suaveolens.* The specimen before me is resupinate, with the margin broadly reflexed. The portion of the pileus next to the tubes, which is very thin, is corky ; the rest consists of a spongy mass of fibres like *Ozonium auricomum* of authors.

38. *P.* (*Apus. Ann. Sub.*) *betulinus,* Fr. On birch. North America. Dr. Richardson.

39. *P.* (*Apus. Ann. Cor.*) *caperatus,* Berk. Hard, ligneo-coriaceous, thin, effused at the base. Pileus zoned, variegated with brown, at first velvety, at length quite naked, sometimes shining. Hymenium pale fawn-coloured; pores minute, nearly round, dissepiments thin. Pileus 4—5½ inches across, 3 inches long, sessile with the vertex sometimes prominently marked with narrow concentric fasciæ, some of which as the fawn-coloured down disappears become wrinkled. Substance hard, brownish bay. Very smooth specimens have a sericeous gloss.

Mauritius. Mr. Telfair. This species is more properly biennial, but it accords, though hard and woody, better with the coriaceous section than any other allied to *P. gilvus.*

40. *P.* (*Apus. Ann. Cor.*) *glabrescens,* Berk. Suberoso-coriaceous, rather thick. Pileus pale ochre, very minutely velvety, zoned; pores minute, round, pale cinnamon; dissepiments thin. Pileus 6 inches broad, 4 inches long, sessile or furnished with a short lateral stem, much incurved when dry. Substance wood-coloured. Much thicker than most of the species in its section, in which it is placed on account of its zoned pileus.

Mauritius. Mr. Telfair.

41. *P.* (*Apus. Ann. Cor.*) *subcinereus,* Berk. Effuso-reflexed, suberoso-coriaceous, imbricated ; pileus dirty white, minutely downy ; margin acute, obsoletely zoned, barren ; pores minute, short, cinereous. Forming longitudinally effused imbricated masses, with the margin more or less reflexed. Pileus ⅝ of an inch long, sometimes, but rarely, quite free and reniform, soft to the touch, minutely downy, with two or three indistinct

zones, generally confined to the margin. Often quite resupinate. Pores cinereous, perhaps tinged with violet when fresh. Substance corky, dirty white.

On *Populus balsamifera.* Carlton House. North America. Dr. Richardson.

42. *P.* (*Apus. Ann. Coriacei*) *versicolor,* Fr. Juan Fernandez. Bertero, No. 1686, May 1830. An ochraceous variety. This is not in Montagne's 'Flora Fernandesiana.'

43. *P.* (*Apus. Ann. Cor.*) *pavonius,* Hook. in Kunth. Syn. vol. i. p. 10. sub *Boleto.* Coriaceo-membranaceous. Pileus flabelliform, lobed, fusco-ochraceous, elegantly zoned, velvety; hymenium of the same colour as the pileus; pores very minute, angular. Pileus 2 inches long and broad, very much narrowed towards the base, very thin, spreading out from the substipitiform vertex.

New Granada. Humboldt.

44. *P.* (*Apus. Ann. Cor.*) *striatus,* Hook. l. c. p. 11. sub *Boleto.* Small, subimbricated, coriaceo-membranaceous; pileus dark brown, zoned, radiato striate; pores cinereous, brown, angular. Pileus $\frac{1}{2}$ an inch broad.

Near Loxa. Humboldt. A very curious and distinct species.

45. *P.* (*Apus. Ann.*) *abietinus,* Fr. Isle à la Crosse. North America. Dr. Richardson.

46. *P.* (*Apus. Ann. Coriacei*) *biformis,* Fr. in litt. Pileus effuso-reflexed, coriaceous, villous, white, zoned; pores middle-sized, toothed, dirty white. Imbricated. Pileus 2—4 inches broad, 1—2 inches long. Pores irregular, sometimes brown tinged with violet.

On birch. North America. Dr. Richardson.

β. Populi balsamiferæ. Pileus obsoletely villous, white; pores rather large, brownish. Pileus constantly thicker at the base, towards the margin void of pores.

Isle à la Crosse. Dr. Richardson. Nearly allied to *Pol. abietinus.* The pubescence sometimes vanishes in great measure, and it then resembles *Pol. versicolor.*

47. *P.* (*Apus. Ann. Cor.*) *laceratus,* Berk. Effuso-reflexed, thin, zoned, smooth, rugoso-striate, wood-coloured. Pores rather large, angular, soon torn, brownish. Dissepiments thin, toothed. Pileus 2 inches broad, $\frac{3}{4}$ of an inch long, allied to

the two last, but differing in the characters of the pileus. The pores are probably tinged with purple when fresh. A very pretty species. The pileus when young is probably tomentose as in the allied species.

New Orleans. Hook. Herb.

48. *P.* (*Apus. Ann. Cor.*) *occidentalis,* Kl. l. c. Effused at the base, thin, coriaceous, yellow-brown. Pileus zoned, reniform, villous, at length velvety. Hymenium even. Pores nearly round, shallow. Nearly of the same tawny yellow throughout. Pileus 4—6 inches broad, 2—3 inches long, with zones of the same colour. Klotzsch describes the dissepiments as very thick, which is the case in some specimens, but when perfect they are thin and the pores middle-sized and angular. The same remark indeed is applicable here as in *Pol. hydnoides.* Some specimens are perfectly resupinate and have the pores arranged concentrically.

St. Vincents, where it is a common species. Rev. L. Guilding.

49. *P.* (*Ap. Ann. Cor.*) *cupreus,* Berk. Thin, coriaceous, flexible. Pileus rounded, effused at the base, slightly lobed, zoned, smooth, coppery-ferruginous. Substance ferruginous. Hymenium ferruginous-cinnamon. Pores very minute, shallow; margin barren. Pileus 2½ inches broad, 2 inches long, very thin, of the same sort of glaucous coppery tint as the hymenium of *Thelephora rubiginosa.*

East Indies, Dr. Wight.

50. *P.* (*Ap. Ann. Cor.*) *tabacinus,* Mont. Ann. d. Sc. Nat. n. s. vol. iii. p. 349.

Mauritius, Mr. Telfair. Differing from the Juan Fernandez plant in being a little less zoned. The substance of this is rich brown, very different from that of *Pol. spadiceus* described above.

51. *P.* (*Apus. Ann. Cor.*) *pruinatus,* Kl. l. c. Pileus effused at the base, gilvo-fuscous, pruinose; margin obsoletely zoned; pores extremely minute, round, fuliginous. Imbricated. Pileus 1 inch long and broad, sometimes tuberculated. Pores 2 lines long. Substance thin, leathery.

Mauritius. Mr. Telfair.

52. *P.* (*Apus. Ann. Cor.*) *Friesii,* Kl. l. c. p. 487. tab. 11.

Pileus coriaceous, thin, reddish-grey, silky, elegantly zoned, flabelliform, lobed; margin incised; pores brown, deeply torn, towards the margin plane, entire. Pileus obsoletely zoned, $2\frac{3}{4}$ inches long and broad, narrowed behind, at length smooth. Margin very thin, sometimes toothed. Dissepiments forming long ligulate processes.

In the warmer parts of North America. It is also marked *Polyp. amœnus*, Klotzsch, from the Cape of Good Hope. Mr. Muller.

53. *P.* (*Apus. Ann. Cor.*) *Drummondii*, Kl. l. c. Pileus imbricated, obsoletely zoned, white tinged with red-brown, thin, subpapyraceous, attenuated at the base; margin dilated, incised, pendulous; pores of the same colour, unequal, toothed, plane towards the margin. Pilei 3—6 lines broad, 8—15 lines long, obsoletely zoned, longitudinally rugulose, often laterally connate, attached at the base by a few byssoid fibres. Dissepiments very thin, inciso-dentate.

New Orleans. Mr. Drummond.

54. *P.* (*Ap. Ann. Cor.*) *palmatus*, Hook. l. c. sub *Hydno*. Pileus palmate, deeply incised and fimbriate, rufescent, slightly zoned, smooth, shining; pores middle-sized, shallow; dissepiments thin, toothed. Pileus $1\frac{1}{4}$ inch long, 2 inches wide. A very elegant species. By an error of the press lines have been substituted for inches in Kunth's synopsis. The colour of the pileus is rufescent rather than yellow-brown.

New Granada. Humboldt.

55. *P.* (*Apus. Ann. Cor.*) *thelephoroides*, Hook. in Kunth. Syn. vol. i. p. 10. sub *Boleto*. Flabellate, plicate, very thin, longitudinally rugose, somewhat flexuous, brown; pores of the same colour, microscopic. Pileus 2 inches long, 4 inches broad. Hymenium even. Pores quite invisible to the naked eye, so that it looks like a *Thelephora*.

Near Loxa. Peru. Humboldt. A most distinct species, resembling none with which I am acquainted. Without more perfect specimens it is not easy to say what are its nearest affinities.

56. *P.* (*Resup.*) *arenarius*, Kl. l. c. Very widely effused; pileus resupinate, dirty white with a slight rufous tinge; pores rather distant, plane, unequal, sinuous.

Running over grass, and in consequence having the hymenium rugged, with variously shaped protuberances. Pileus 6—8 inches broad and long, $\frac{1}{2}$ an inch thick, of the same colour within.

On sandy soil. East Indies. Dr. Wight, No. 85.

57. *P.* (*Resup.*) *vulgaris,* Fr.

Mauritius. Mr. Telfair. Carlton House, North America. Dr. Richardson. Juan Fernandez. Bertero.

Hydnum.

H. (*Resup.*) *delicatum,* Kl. in Hook. Herb. Orbicular, effused, with the border slightly reflexed; tomentose above, ochraceous; hymenium dirty-white; prickles purplish-grey, scattered, simple, short, conical, with sub-clavate tips.

On decaying *Jatropha Curcas.* Madras. Dr. Wight.

Irpex.

1. *I.* (*Effuso-ref.*) *fusco-violaceus,* Fr. *Irpex Richardsonii,* Hook. Herb. On pine trunks. North America. Dr. Richardson.

2. *I.* (*Effuso-ref.*) *lacteus,* Fr. North America. Dr. Richardson.

3. *I.* (*Resup.*) *flavus,* Kl. l. c. p. 488. Pileus resupinate, yellow, of a soft spongy texture, margin villous, slightly reflexed, teeth oblique, compressed, unequal, incised, connected by a network of veins, widely effused, confluent, often thickly clothing the branchlets of trees. My specimens have the margin slightly reflexed, on which account I am inclined to consider them imperfect, and referable to the preceding tribe.

North America. Dr. Richardson.

Thelephora.

1. *T.* (*Apus*) *striata,* Fr. North America. Dr. Richardson.

2. *T.* (*Apus*) *lobata,* Kze. Fr. in Linn. *T. affinis,* Kl. in Hook. Herb. North America. Dr. Richardson. New Orleans. Mr. Drummond. Mauritius. Mr. Telfair.

3. *Th.* (*Apus*) *complicata,* Fr. in Linn. *T. delicatula,* Kl. in Hook. Herb. Resupinate, free, pendulous, papyraceous; margin lobed, often crisped and plicate, sericeo-striate, delicately zoned, red-brown; hymenium smooth. At first gene-

rally forming orbicular resupinate patches which soon become confluent, with the border free almost to the centre, lobed, often multipartite, crisped and plicate; sometimes flabellate, adhering only by the vertex, which assumes the form of a stem. The older portions are clothed with whitish down, the newer are smooth and shining bright red-brown, elegantly zoned.

On twigs. New Orleans. Fries appears not to have seen orbicular roundly-lobed specimens in which the pileus is closely and most elegantly zoned. In plicate individuals the zones are obscure. New Orleans. Mr. Drummond. Klotzsch says N. A., Dr. Richardson, but I suspect this is a mistake.

Geoglossum.

G. hirsutum, var. *hirsutiusculum*, Berk.

A smaller plant than the European, but differing in no respect from it except in the bristles being shorter. The analysis of both is similar, the asci being shorter and stouter than in *G. glabrum*. The sporidia in both species are very distinctly septate.

Mauritius. Mr. Telfair.

Peziza.

1. *P. anomala*, Pers. *P. solenia?* videtur diversa et fortasse n. sp. Bertero. No. 1701.

On bark and *Sphæriæ*. Juan Fernandez. 1830, May. Not in Fl. Fern.

2. *P.* (*Phial. Hymenosc.*) *utriculus*, Bert. Mss. No. 1702. Scattered; cups white, hemispherical, membranous, smooth, crisped; stem slender, rather long.

On dead wood. Juan Fernandez. Bertero. 1830, May. Not noticed by Montagne. Resembling *Peziza Campanula*, but much smaller.

Exidia.

1. *E. hispidula*, Berk. Globoso-campanulate, oblique, sessile within, brown-black, externally fawn-coloured, clothed with short bristly down. *Peziza nigricans*, Hook. in Kunth. Syn. vol. i. p. 13.

New Granada. Humboldt. Mauritius. Mr. Bojer. St. Vincents. Rev. L. Guilding. Nearly allied to *E. auricula Judæ*, but the down is longer and more bristly.

NIDULARIA.

N. striata, Bull, var. *pusilla*, Berk. Smaller, only $\frac{1}{4}$ an inch high. Furfuraceous above. Striæ confined to the margin. Colour dull umber, not bright brown. Very near to *N. plicata*, Fr., a Brazilian species. That however appears to be even more strongly grooved than *N. striata*.

West Indies.

SPHÆRIA.

1. *S.* (*Cordyceps*) *digitata*, Fr. Negapatam. Dr. Wight.

2. *S.* (*Cordyceps*) *allantodia*, Berk. Corky; stem extremely short, almost obsolete, smooth; stroma clavate, obtuse, thick, coated with a thick rigid brown-black bark; perithecia small, globose; ostiola minute, prominent; about 4 inches high, 1 inch thick, attenuated below, often curved, at first solid throughout, with the inner substance firm and pale brown, at length more or less hollow, resembling closely a small black-pudding. Some specimens are more elongated and thinner. Outer coat black, with a brown bloom like that of some exotic *Polypori*, very hard and rigid, distinct from the substance, in old plants sometimes contracted. Perithecia small, crowded. Ostiola minute, rather prominent.

Brazil.

3. *S.* (*Cordyceps*) *Telfairii*, Berk. Corky, club-shaped, more or less obtuse above, clothed with very brittle fawn-coloured bark dotted with the black orifices of the rather large perithecia. About $2\frac{1}{2}$ inches high, $\frac{1}{2}$ an inch thick; solid; bark extremely brittle, black coated with a thin distinct fawn-coloured coat, apt to become involute. Perithecia rather large, subglobose. Ostiola black, slightly prominent. Asci long, linear, slender, containing eight segmentiform sporidia, which occasionally contain a single central sporidiolum.

Mauritius. Mr. Telfair. This is marked by Klotzsch *S. involuta*, spec. nov. I have thought it best not to adopt the manuscript name, as the bark in other allied species is often involute.

4. *S.* (*Cordyceps*) *obovata*, Berk. Stem short, smooth, gradually swelling out into a short obovate club, hollow, lined with a papyraceous coat; bark black; perithecia rather large, scattered; ostiola very minute. Whole plant not $\frac{3}{4}$ of an inch

high, $\frac{1}{2}$ an inch thick above, extremely obtuse; bark brittle, black; ostiola not visible to the naked eye; perithecia rather large, globose. Asci and sporidia as in *S. Telfairii*. Nearly allied to *S. papyracea*, but differing in size and form.

St. Vincents. Rev. L. Guilding.

5. *S.* (*Cordyceps*) *gracilis*, Kl. in Hook. Herb. *S. digitata*, Hook. in Kunth. Syn. vol. i. p. 7. Corky; stem smooth, forked, fastigiate, slender, subacute, barren at the apex. Intermediate between *S. digitata* and *S. multiplex*, Kz. About $1\frac{1}{2}$ inch high, 1 line thick, dull black; bifid or trifid, cæspitose. Perithecia extending sometimes below the origin of the forks.

Andes. Humboldt.

6. *S.* (*Connatæ*) *pruinata*, Kl. in Linn. l. c. p. 489. Perithecia globose, effused, growing together, emersed, clothed with white meal, black within; ostiola black, prominent. *S. farinosa*, Kl. in Hook. Herb. Forming small round pruinose patches, dotted with the black ostiola. Allied to *S. serpens*. Certainly not belonging to the tribe *Concrescentes*.

North America. On poplar. Dr. Richardson.

7. *S.* (*Globosæ*) *nummularia*, Dec.

On dead branches. Juan Fernandez, No. 1726. May, 1830. Not in Fl. Fern.

8. *S.* (*Depazea*) *Drymidis*, Berk. Epiphyllous, spots white, orbicular, with a distinct brown raised border; perithecia black, mostly disposed in a single ring near the margin.

On dead leaves of *Drymis*. Juan Fernandez, May, 1830. No. 1727. Not in Mont. Fl. Fern. A very pretty species.

Dothidea.

1. *D.* (*Erumpentes*) *granulosa*, Kl. in Hook. Herb. Hypophyllous, suborbicular, confluent, very thin, depressed, black, most minutely granulose with the superficial cells. Forming little patches, scarcely 1 line broad.

On leaves of *Eugenia Temu*, Hook. and Arn. Valparaiso in Chili.

2. *D.* (*Xyloma*) *Musæ*, Kl. l. c. Epiphyllous, black, consisting of distinct cells, either scattered or collected in round spots. Spots 1 line broad. Cells very minute, shining.

On leaves of *Musaceæ*. East Indies. Dr. Wight. Cells arranged in lines, following the nervation of the leaf.

3. *D.* (*Asteroma*) *conspurcata*, Berk. Flat, membranous, uniform, orbicular, dull pitch-brown; perithecia few, scattered, hemispherical, of the same colour. Forming small brown spots on the under and upper side of the leaf, exactly like fly-specks. The margin though irregular is not the least fimbriate, or it would more properly be placed in the genus *Asteroma*.

On the leaves of a myrtle called *Luma*, in hilly woods. Juan Fernandez. Bertero. May, 1830. No. 1728. Not in Mont. Fl. Fern.

PHACIDIUM.

P. depressum, Hook. Mss. *Sph.? depressa*, Hook. in Kunth. Syn. vol. i. p. 7. Scattered, orbicular, depressed, opening with 5—6 black acute laciniæ; disk black, at length naked, bordered by the excipulum. About the size of *P. coronatum*. Asci short, linear, obtuse. I do not find curved paraphyses as in that species.

Andes, with *S. gracilis*. Humboldt.

EXCIPULA.

E. gregaria, Fr. in Linn. l. c. p. 552. On petioles of *Carica Papaya*. Mauritius. Mr. Bojer.

GEASTER.

1. *Geaster plicatus*, Berk. *Geaster striatus*, γ *plicatus*, Kl. Mss. in Hook. Herb. Outer peridium soft, papyraceous, pale umber, smooth; laciniæ about 7, acute; inner peridium seated on a long peduncle, globose, dark umber, smooth, strongly plicate at the base; orifice seated in a circular depression, conical, plicato-sulcate. Sporidia brown.

Madras. Dr. Wight. Nearly allied to *G. striatus*, β. *minimus*, but certainly distinct. The folds at the base of the inner peridium are very remarkable.

2. *G. limbatus*, Fr. North America. Dr. Richardson.

3. *G. minimus*, Schwein.! North America. Dr. Richardson.

4. *G. rufescens*, Pers. *G. fimbriatus*, Kl. in Linn. North America. Dr. Richardson.

5. *G. hygrometricus*, Pers. North America. Dr. Richardson.

BOVISTA.

B. argentea, Berk. Oval, depressed; inner peridium extremely thin, papyraceous, shining, silvery without; within as well as the minute sporidia and capillitium of a pale dingy red-brown. Larger diam. $2\frac{5}{8}$ inches, smaller $2\frac{1}{8}$; depth about 1 inch. Inner peridium resembling very thin paper which has been washed with silver. The sporidia and flocci resemble in colour coffee and cream.

Madras. Dr. Wight. In the herbaria of Sir W. J. Hooker and N. B. Ward, Esq.

LYCOGALA.

L. epidendrum, Fr. St. Vincents. Rev. L. Guilding. Both the common state, and one with grey-green sporidia.

DIACHEA.

D. elegans, Fr. On the leaves of a *Paulinia*. Brazil. Mr. Boog.

STEMONITIS.

S. fusca, Roth. *Tilostylus jungermannioides*, Kl. Mss. in Hook. Herb.

Mauritius. Mr. Bojer. Carlton House. North America. Mr. Drummond.

ONYGENA.

O. equina, Pers. On buffaloes' horns. North America. Dr. Richardson.

TESTICULARIA.

Pseudoperidia aggregate, forming a dense mass. Sporidia more or less mixed with simple flocci.

T. Cyperi, Kl. in Linn. vol. vii. p. 202.

Parasitic on *Cyperi*, occupying the place of the seed, solitary or two together, ovate or oblong, about the size of a large pea or acorn. Outer coat white, papyraceo-corneous, brittle, at length bursting at the apex, farinoso-floccose, filled with naked black pseudoperidia resembling gunpowder. Sporidia globose, accompanied by simple flocci.

On *Cyperi*. North America.

This extremely curious genus is considered by Klotzsch as uniting the *Angiogastri* with the *Trichospermi*. I cannot concur in this notion. I feel little doubt that its proper situation

is amongst the epiphytous Coniomycetes, and that it is indeed nearly allied to *Uredo urceolorum*, &c. It will be seen, on looking at Corda's figure, Ic. Fung. tab. 8. fig. 12, that the sporidia in that species are clothed with a cellular integument. *Testicularia* is a compound *Uredo*, the cellular integument of its globules being a pseudoperidium, and the contained granules sporidia. I have not been able to see the flocci as distinctly as they are represented by Klotzsch. There are traces of flocci in *U. urceolorum*.

ÆCIDIUM.

Æ. Euphorbiæ, Dec. Mauritius. Mr. Telfair.

XLIII.—*Remarks on the Generic Distribution of the British* Hydromyzidæ (DIPTERA). By A. H. HALIDAY, Esq.

[Continued from p. 224.]

Gen. 3. HYDRELLIA.

Caput oblatum. Oculi confertissime pilosi, quasi velutini. Mentum parum incrassatum. Antennæ articulo 2° exunguiculato. Alæ exunguiculatæ.

Every facet of the compound eyes appears to produce a short erect hair from its centre, which gives a velvety pile to the whole, and an indefinite outline when viewed by a magnifier, unless in the direction of a row of the lenses.

Subgenerum Synopsis.

Arista
- dorso pectinata
- facies
  - convexa ..... 1. Hydrellia.
  - impressa ..... 2. Atissa.
- subtilissime pubescens ..... 3. Glenanthe.

Subg. 1. HYDRELLIA, *Desv.*

Antennæ articulo 3° ovato aut orbiculato, compresso, deflexo; arista dorso pectinata. Facies convexa, superne attenuata, squamuloso-micans, puncto lucido antennarum basin superante. Palpi subdilatati. Alæ apice rotundatæ. Nervus discoidali-recurrens ab alæ margine parum distans.

As the species of this group are subject to some variation in the colour of the face, antennæ and mouth, a more particular examination of the specific characters is required. This will not be difficult, as they generally occur in great profusion

in their favourite localities. The general colour of the body is rather uniform, ranging from a dull olive or cinereous shade to a shining black. The halteres are sulphureous, with the base black in the dark-coloured species, brown or tawny in the others.

Sp. 1. *cardamines*, H. nigro-æneseens, antennis subtus facie ore palpis coxis et tibiis anticis totis tibiis posterioribus apice tarsisque basi fulvis; *m. f.* $\frac{3}{4}$—$1\frac{1}{4}$ lin.

Var. β. Facie albo-micante.

Var. γ. Antennis et mento nigris.

Among aquatic plants, Hollywood; local but not rare.

Sp. 2. *flaviceps*, H. obscure viridis antennarum articulo 3° tibiis tarsisque fulvis, tibiis posticis annulo fusco, ore palpisque flavis, facie flava albo-micante.

Notiphila flaviceps. Meig. Dipt. Eur. vi. 72.—*Discocerina id.* Macq. S. à B. ii. 527.—*Hydrellia aurifacies*. Desv. Myod. 791.

In marshes about Hollywood; June; rare.

Sp. 3. *hydrocotyles*, H. obscure viridis tibiis anterioribus et posticarum apice palpis tarsisque fulvis, facie albissima: *f.* 1 lin.

Hydrellia communis. Desv. Myod. 791 ?

Hollywood; extremely rare.

Sp. 4. *porphyrops*, H. nigricans antennarum articulo 3° tibiis apice tarsis basi fulvis, facie ore palpis flavis, puncto frontali albo, oculis hyacinthinis; *m.* $\frac{4}{5}$ lin.

This distinct and beautiful species has occurred but once at Hollywood among *Mentha sylvestris* in a ditch. The eyes are large and of an exquisite purple tint, and the face remarkably small. The eyes are dark green or brassy in most other species.

Sp. 5. *thoracica*, H. thorace cinereo obsolete lineato, facie alba, palpis nigris, tarsis posterioribus ferrugineis; *m. f.* $1\frac{1}{3}$ lin.

On the sea-coast, Hollywood; June; rare.

A very distinct species, of robust form, and the only one which has any vestige of markings on the body. The middle and hind tibiæ are evidently thicker than the fore pair. The discoidal recurrent nerve is very near the margin.

Sp. 6. *Ranunculi*, H. nigro-olivacea facie alba, tarsis posterioribus basi palpisque ferrugineis, nervo transverso subobliquo: *m. f.* $1\frac{1}{3}$ lin.

Abundant in meadows and marshes. This is probably the

variety of *H. griseola* with a white face, of which Fallen makes mention, but he is mistaken in considering it as a sexual distinction.

Sp. 7. *griseola*, H. viridi-cinerea, subtus schistacea, facie flavicante, puncto frontali albissimo, tarsis posterioribus basi palpisque ferrugineis, alis hyalinis nervo transverso perpendiculari.

Macq. S. à B. ii. 523. pl. 21. fig. 10.—*Notiphila id.* Fallen, Act. Holm. 1813. p. 250. Hydrom. 9. Meigen, Dipt. Eur. vi. 66.

The most abundant species in meadows. The wings and legs are particularly long. The palpi usually dusky at the base. The distinct white dot above the antennæ is rarely wanting.

Sp. 8. *chrysostoma*, H. nigro-olivacea facie flavicante palpis ferrugineis, nervo transverso subobliquo.

Notiphila id. Meig. vi. 67.—*Hydrellia viridescens.* Desv. Myod. 793 ?

Not rare in marshes.

Sp. 9. *tarsata*, H. nigro-olivacea facie palpisque flavis ; femoribus anticis validis, tarsis iisdem subtus flavo-tomentosis, onychiis longiusculis rufescentibus ; *m.* $1\frac{1}{4}$ lin.

Distinguished particularly by its onychii ; those of the other species being short and white in both sexes.

Found but once at Hollywood.

Sp. 10. *albiceps*, H. nigro-ænescens facie alba, palpis ferrugineis, alis obscuris, halteribus basi nigris.

Variat labellis ferrugineis et antennarum articulo 3° subtus vel etiam toto fulvo.

Macq. S. à B. ii. 526.—*Notiphila id.* Meigen, Dipt. Eur. vi. 68. *Hydrina fuliginosa.* Desv. Myod. 793 ?

Common in marshes.

Sp. 11. *erythrostoma*, H. nigro-ænescens antennarum articulo 3° facie palpisque fulvis, puncto frontali albissimo, alis obscuris, halteribus basi nigris.

Variat puncto frontali flavicante ; etiam antennarum articulo 3° fusco.

Macq. S. à B. ii. 526.—*Notiphila id.* Meig. Dipt. Eur. vi. 69.

Common on moist grassy slopes of mountains and in marshes.

Sp. 12. *Cochleariæ*, H. nigro-ænescens facie flavicante, palpis nigris, alis obscuris, halteribus basi nigris ; *f.* 1 lin.

Very like the last, but I am inclined to consider it a distinct species.

Hollywood ; June ; rare.

Sp. 13. *albilabris*, H. nigra nitida facie alba, antennarum articulo 3° fulvo, halteribus basi palpisque nigris.

Notiphila id. Meig. Dipt. Eur. vi. 71.—*Discocerina id.* Macq. S. à B. ii. 528.—*Hydrellia argyria.* Desv. Myod. 793.

The third joint of the antennæ is more orbiculate than in the rest, and the wings nearly lanceolate, with the radial nerve shorter.

In meadows; Hollywood; very rare.

Subg. 2. Atissa, *Curt. Guide App.*

Antennæ articulo 3° sphæroideo subcompresso, arista dorso breviter pectinata. Facies brevis sub antennis utrinque impressa margine infero prominulo. Alæ lanceolatæ. Nervus discoidali-recurrens a margine remotus.

Sp. 14. *pygmæa*, H. A. cinerea facie albida, antennis tarsisque ferrugineis. $\frac{2}{3}$ lin.

Ephydra id. Ent. Mag. i. 174.

In a salt marsh, Hollywood.

Subg. 3. Glenanthe.

Antennæ articulo 3° orbiculato compresso, arista brevi subtilissime pubescente. Facies sub antennis utrinque impressa, medio longitrorsum convexa. Oculi inferne attenuati, subangulati. Nervus discoidali-recurrens ab alæ margine distans. *Fem.* Abdomen apice rima longitudinali tuberculum muricatum includente.

Sp. 15. *ripicola*, H. G. cinerea fronte thoraceque ferruginosis, antennis tibiis tarsisque ferrugineis, facie albida; *m. f.* 1 lin.

On the muddy sea-coast, Hollywood.

Gen. 4. EPHYDRA, *Fallen.*

Oculi glabri s. vage pubescentes. Antennæ articulo 2° exunguiculato. Proboscis magis incrassata. Femora subæqualia.

Subgenerum Synopsis.

Areolæ probrachialis et analis
  parvæ completæ, ... 11. Canace.
  incompletæ;—ungues
    subrecti onychiis obsoletis, ... 10. Ephydra.
    curvati onychiis hirsutis;—caput
      parum depressum:—nervus transversus
        prope marginem alæ, ... 4. Pelina.
        a margine remotus;—facies
          lateribus ciliata, ... 1. Hydrina.
          vix nisi nuda;—nervus costalis
            alæ apicem ambiens, ... 2. Hyadina.
            in alæ apice desinens, ... 3. Axysta.

[Caput] depressum;—clypeus
exertus, ... 5. Napæa.
reconditus;—peristoma margine
nudum, ... 6. Ilythea.
villosum s. pectinatum:—arista
dorso pectinata, ... 7. Cœnia.
pubescens,.. ..... 8. Scatella.
glabra, ... 9. Teichomyza.

Subg. 1. Hydrina, *Desv.*

Facies proclivis subtriangularis convexa, lateribus subtiliter ciliata. Antennæ mediocres articulo 3° subdeflexo, oblongo, dorso subimpresso: arista pubescens aut dorso pectinata. Palpi parum dilatati. Abdomen 5-annulatum convexum, apice glabrum. Nervus discoidali-recurrens ab alæ margine distans.

* *Arista dorso longe villosa s. pectinata.*

The minute species belonging to this section are remarkable for the distinct variegation of their colours. The only European species described is the following:

Sp. 1. *picta*, E. Hydr. thorace fusco utrinque linea alba, scutello aterrimo, antennis subtus pedibusque testaceis.

Meig. Dipt. Eur. vi. 125.—*Notiphila id.* Fallen, Act. Holm. 1813. p. 254. Hydrom. ii.

Variat femoribus nigris, *aut* pedibus nigris tarsis basi rufescentibus.

Common on grass in shady places.

** *Arista pubescens.*

Sp. 2. *punctato-nervosa*, E. Hydr. thorace cinereo, antennis pedibusque flavis, alis seriatim fusco-punctatis, nervis transversis fuscis.

Meig. Dipt. Eur. vi. 123.—*Notiphila id.* Fallen, Act. Holm. 1813. p. 254. Hydrom. 12.

In sandy places; Portmarnock; Hollywood.

Sp. 3. *flavipes*, E. Hydr. thorace cinereo, facie antennis pedibus flavis; nervis transversis fuscis.

Meig. Dipt. Eur. vi. 123. Fallen, Hydrom. 12.

Not rare in meadows.

Sp. 4. *stictica*, E. Hydr. thorace cinereo fusco-vittato, facie antennis pedibus flavis, alarum nervis transversis et puncto fuscis.

Meig. Dipt. Eur. vi. 121. Macq. S. à B. ii. 539.

Common in meadows.

Sp. 5. *interstincta*, E. Hydr. thorace fusco-cinereo, tibiis tarsisque ferrugineis, alarum nervis transversis et punctis 6 fuscis.

Meig. Dipt. Eur. vi. 122. Macq. S. à B. ii. 539.—*Notiphila id.* Fallen, Act. Holm. 1813. p. 254. Hydrom. 12.—*Hydrina maculipennis.* Desv. Myod. 795.

Common on grass.

Sp. 6. *interrupta*, E. Hydr. thorace cinereo fusco-vittato, facie antennis tarsisque flavis, alis fuscis disco hyalinis nervis transversis fuscis.

Ent. Mag. i. 176.

Sandy shore of Killiney bay, county Dublin; Hollywood; rare.

Sp. 7. *posticata*, E. Hydr. cinerea abdominis apice nigro, facie antennis tarsisque flavis, alis hyalinis.

Meig. Dipt. Eur. vi. 124. Macq. S. à B. ii. 539.

Not uncommon.

Subg. 2. Hyadina, *Curtis, Guide, App.*

Facies perpendicularis superne parum angustata vix nisi nuda. Arista pubescens. Abdomen 5-annulatum segmento 5° magno glaberrimo. Nervus costalis alæ apicem ambiens. Nervus discoidali-recurrens ab alæ margine distans. Nervi brachiales ibidem sinu approximati.

Sp. 8. *guttata*, E. Hyad. nigra subnitida scutelli lateribus aterrimis, antennis subtus pedibusque testaceis, alis albo-biguttatis.

Meig. Dipt. Eur. vi. 125.—*Notiphila id.* Fallen, Act. Holm. 1813. 253. Hydrom. 11.—*Ephydra nitida.* Macq. S. à B. ii. 539. *Hydrina vernalis.* Desv. Myod. 795.

Varies, with the legs dusky, also with the face silvery-white or straw colour. The clear dot above and below the transverse nerve is not very evident unless when the wings overlap.

Common in swampy spots.

Sp. 9. *scutellata*, E. Hyad. nigra subnitida scutello aterrimo, antennis subtus pedibusque testaceis, alis albo-biguttatis.—vix 1 lin.

Hollywood; very rare.

Subg. 3. Axysta.

Facies perpendicularis medio subconvexa, superne parum angustata, vix nisi nuda. Arista pubescens. Abdomen quasi tri-annulatum, i. e. segmentis 1° et 5° minimis, basi marginatum. Nervus costalis in alæ apice evanescens: nervus discoidali-recurrens ab alæ margine distans: nervi brachiales ibidem sinu approximati.

Sp. 10. *viridula*, E. A. nigra nitida abdomine punctatissimo cyanescente, facie albida vitta nigra.

Hydrina viridula. Desv. Myod. 795?—*Ephydra cesta.* Ent. Mag. i. 177.—*Trimerina cæruleiventris.* Macq. S. à B. ii. 529. pl. 21. fig. 12?

On grass; Hollywood; rare.

Subg. 4. Pelina, *Curt. Guide, App.*

Facies latissima perpendicularis lateribus tenuissime ciliata; clypeus subexertus. Arista subtilissime pubescens. Abdomen depressum. Nervus discoidali-recurrens prope marginem alæ.

Sp. 11. *ænea,* E. P. obscure ænea facie albicante, tarsis flavis, alis hyalinis.

Meig. Dipt. Eur. vi. 124.—*Notiphila id.* Fallen, Act. Holm. 1813. p. 253. Hydrom. 11.—*Ephydra glabricula.* Meig. Dipt. Eur. vi. 121. Macq. S. à B. ii. 538.

Common among aquatic plants.

Subg. 5. Napæa, *Desv.*

Caput depressum: facies proclivis latissima vix nisi nuda; clypeus exertus. Mentum valde incrassatum. Arista basi pubescens. Corpus pedesque subglabri. Abdomen depressum suborbiculatum. Nervus præbrachialis-recurrens fere in medio alæ.

* *Nervus radialis apice appendiculatus.*

Sp. 12. *coarctata,* E. N. fusco-ænea tarsis basi ferrugineis, alis fuscanis nervis transversis obscuris, arista nisi basi nuda.

Fallen, Act. Holm. 1813, p. 247. Hydrom. 4. Meig. Dipt. Eur. vi. 116.—*Eph. rufitarsis.* Macq. S. à B. ii. 536. pl. 22. f. 2.—*Napæa stagnicola major.* Desv. Myod. 800.

Abundant on pools.

Sp. 13. *litoralis,* E. N. obscure ænea tarsis basi ferrugineis, alis fuscanis, nervis transversis obscuris utrinque hyalino-guttatis, arista villosa.

Meig. Dipt. Eur. vi. 116. tab. 60. fig. 8. Macq. S. à B. ii. 536.

Less common than the preceding.

E. 4-punctata, M., also belongs to this group.

** *Nervus radialis simplex.*

Sp. 14. *Aquila,* E. N. fusco-ænea alis fuscanis, nervis transversis obscuris, tibiis basi apiceque albis, tarsis ferrugineis.

Fallen, Act. Holm. 1813, 247. Hydrom. 4. Meig. Dipt. Eur. vi. 117. Macq. S. à B. ii. 537.

Not rare on pools at Hollywood.

Sp. 15. *fossarum,* E. N. fusco-ænea tarsis basi ferrugineis, alis fuscanis, nervis transversis obscuris.

Ent. Mag. i. 175.—*Napæa stagnicola minor.* Desv. Myod. 800 ?
Abundant on pools.

Sp. 16. *hecate*, E. N. fusco-ænea tarsis basi ferrugineis, alis fuscanis, nervis transversis obscuris utrinque hyalino-guttatis.

Ent. Mag. i. 175.—*Eph. fuscipennis*, Macq. S. à B. ii. 540.
Hollywood: very rare.

Sp. 17. *pusilla*, E. N. nigro-ænea facie albicante, pedibus nigris, alis fuscanis nervis transversis obscuris.

Meig. Dipt. Eur. vi. 126.—*Eph. infecta.* Ent. Mag. i. 175.
Hollywood, &c., rare.

Subg. 6. Ilythea, *Curt. Guide, App.*

Caput depressum, facie convexa inter antennas elevata, nisi lateribus nuda; clypeo recondito. Mentum incrassatum. Labella crassa, retro-producta obtusa. Arista dorso pectinata.

Sp. 18. *Spilota*, E. I. nigra facie ferruginosa, tarsis flavis, alis nigro-punctatis.

Curtis, Brit. Ent. 413.
Not rare about pools and ditches.

Subg. 7. Cœnia, *Desv.*

Caput depressum facie protuberante et margine peristomatis villosis aut setosis; clypeo recondito. Arista dorso pectinata. Mentum valde incrassatum.

* *Antennæ articulo 3° obtuso.*

Sp. 19. *albula*, E. Cœn. thorace obscure æneo, abdomine glauco incisuris obscuris, facie cinerascente, halteribus albidis.

Meig. Dipt. Eur. vi. 115.
Loch Fad, Isle of Bute; August.

Sp. 20. *palustris*, E. Cœn. nigro-ænea facie setosa, capite pedibusque nigris, halteribus fuscanis.

Fallen, Hydrom. 4. Meig. Dipt. Eur. vi. 115.—*Cœnia, id.* Macq. S. à B. ii. 530. pl. 21. fig. 14.—*Cœnia caricicola*, Desv. Myod. 800.
Common in marshes. Erroneously cited as *Eph. curvicauda* in my list of *Diptera* occurring about Hollywood, 'Ent. Mag.' i. 150.

Ephydra obscura, Meig., which has been found in England by Mr. F. Walker, belongs to the same section.

** *Antennæ articulo 3° subconico.*

Sp. 21. *defecta*, E. Cœn. nigro-ænea scutello cyanescente, antennis subtus tarsisque luteis, alis obscuris hyalino-guttatis.

Ent. Mag. i. 174.
Common in swampy spots.

Subg. 8. Scatella, *Desv.*

Caput depressum facie buccata et margine peristomatis villosis aut setosis; clypeo recondito. Arista arcuata pubescens. Antennæ articulo 3° obtuso. Ungues curvati divaricati. Onychii manifesti.

Sp. 22. *sibilans*, E. S. ferruginosa abdomine ænescente, facie flavida setosa, alis obscuris.

Ent. Mag. i. 175.

Very common on the sea-coast, Hollywood.

Sp. 23. *leucostoma*, E. S. olivacea facie villosa albicante, alis obscuris nervo transverso a margine remōto.

Meig. Dipt. Eur. 121.

Not uncommon on marine rejectamenta.

Sp. 24. *sorbillans*, E. S. olivacea facie pubescente alba, alis cinerascentibus indistincte hyalino 5-guttatis, *m. f.* $1\frac{1}{3}$ lin.

Not rare on the sea-coast.

Sp. 25. *æstuans*, E. S. cinerea fronte thoracisque dorso ferruginosis, facie flavida, tarsis ferrugineis, alis ferruginosis guttis 5 albis anteriore majore quadrata.

Ent. Mag. i. 176.

Common on fuci.

Sp. 26. *buccata*; E. S. nigra fronte thoraceque fuscis, facie flavicante, alis fuliginosis hyalino 5-guttatis.

Scatella buccata, Desv. Myod. 801.—*Ephydra stagnalis*? Fallen. Act. Holm. 1813, p. 248. Hydrom. 5? Meig. Dipt. Eur. vi. 118? Macq. S. à B. ii. 537?

The most abundant species. Fallen has probably confounded with his *E. stagnalis* all the species with hyaline dots on the dark ground of the wings; and though Meigen has very fully distinguished many species of this character, I can scarcely identify any of mine exactly with his descriptions.

Sp. 27. *lutosa*, E. S. fusco-cinerea fronte thoraceque ferruginosis, facie flavicante, tarsis ferrugineis, alis infumatis hyalino 5-guttatis.

Ent. Mag. i. 176.

Found along with the last and almost equally abundant.

Sp. 28. *despecta* (Curt. App.), E. S. cinerea thorace fusco lineolis albidis, facie albida, alis cinerascentibus obsolete hyalino-guttatis, *m. f.* femoribus mediis subtus basi pectinatis, *m.* 1 lin.

On the sea-coast and in sandy places: not common.

Sp. 29. *noctula*, E. S. nigricans thorace fusco lineolis albidis, facie flavicante, tarsis ferrugineis, alis fuscanis hyalino guttatis.

Meig. Dipt. Eur. vi. 119. Macq. S. à B. ii. 537.

Common in moist places.

Sp. 30. *comta*, E. S. nigra thorace fusco, facie albida, alis fuscanis hyalino guttatis.

Ent. Mag. i. 176.—*Scatella cinerea*. Desv. Myod. 801 ?

Generally one half less than the last species, of which it may be a variety.

Sp. 31. *quadrata*, E. S. nigricans thorace fusco lineolis albidis, tarsis ferrugineis, alis fusco nubeculosis margine antico nigro-tessellato.

Fallen, Hydrom. 5. Meig. Dipt. Eur. vi. 119. Macq. S. à B. ii. 538.—*Notiphila id.* Fallen, Act. Holm. 1813, 255.—*Eph. graminum.* Ent. Mag. i. 176.

Common. Varies with the face yellowish or whitish.

To the same group belong *E. paludum*, *E. lacustris*, and *E. 4-guttata*, Meigen.

Subg. 9. Teichomyza, *Macq.*

Caput depressum, facie longe porrecta fornicata setosa, sub antennis impressa; clypeo recondito. Peristomatis margo pectinatus. Antennæ arista elongata glabra tenui. Ungues validi curvati, onychiis conspicuis hirtis. Abdomen feminæ apice subcompressum rima verticali.

Sp. 32. *fusca*, E. T. fusco-olivacea thorace lineolis 2 anticis cinereis, alis fuliginosis, *m. f.* Femoribus mediis subtus pectinatis, metatarso antico incrassato, *m.*

Teichomyza fusca. Macq. S. à B. ii. 535.

On the walls of damp outhouses, in winter; where the larvæ (as observed by Macquart) are fed among the decomposed mortar.

Subg. 10. Ephydra.

Caput depressum, facie porrecta fornicata villosa; peristoma margine pectinatum. Mentum canaliculatum, labella in quiete retrocuspidata excipiens. Antennæ articulo 3° conico; arista basi villosa. Ungues subrecti. Onychii obsoleti.

The singular larvæ of this group are figured by Bouché. The posterior spiracles are placed each at the extremity of a slender conical shaft, springing from a common stem, and with it longer than the rest of the body.

Sp. 33. *riparia*, E. obscure ænea alis fuscanis, facie alba aut flavicante, arista villosa.

Var. α. tibiis tarsisque basi testaceis.

Var. β. thoraceque ferruginoso.

Var. γ. pedibus nigris.

Fallen, Act. Holm. 1813, p. 255. Hydrom. 5. Meig. Dipt. Eur. vi. 117. Macq. S. à B. ii. 537.—*Ephydra salinarum.* Bouché, Naturg. Ins. i. 99. tab. 6. fig. 13—14, larva and pupa.

Sp. 34. *micans*, E. obscure viridis pedibus nigris, alis fuscanis, arista nonnisi basi pubescente, facie alba aut flavicante.

Ent. Mag. i. 175.

This may be a mere variety of the last species; as such Fallen has considered it.

Subg. 11. Canace, *Curt. Guide, App.*

Caput depressum. Facies transversa, perpendicularis, subimpressa, lateribus ciliata; clypeus exertus; peristoma magnum. Oculi elliptici transversi. Arista pubescens. Abdomen conicum, 7-annulatum, segmento 2° maximo. Areolæ præbrachialis et analis parvæ completæ.

Sp. 35. *nasica* (Curt. App.), E. Can. cinerea fronte thoraceque ferruginosis, facie albida, tarsis basi ferrugineis. $1\frac{1}{4}$ lin.

England; communicated by F. Walker.

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XLIV.—*Further Remarks on the Morphology of the Ascidia of Plants.* By M. Ch. Morren, Professor of Botany at Liège, Member of the Royal Academy of Brussels.

From the notice on the morphology of the ascidia which I recently presented to the Academy* it may be seen that I consider the cuculliform pitcher of plants as a variation in form

* A translation of which appeared in No. XVIII. of this Journal.

of the blade of the leaf. The leaf coheres by its margins and above, absolutely as in the formation of carpels, which made me say that the ascidium is a tendency to the floral form. Since this period new facts have confirmed this theory. During my stay at Newcastle in Northumberland, at the Meeting of the British Association, I had an opportunity of studying the different preparations of monstrosities which the Rev. W. Hincks of York, known by his 'Monograph of the *Œnotheræ*,' had brought there. Amongst these specimens were two of the most remarkable accidental ascidia, and which permit us to classify these extraordinary deviations. One was on a specimen of *Tulipa gesneriana*. The leaf which, as is well known, sheaths the peduncle in this plant, had cohered at its free margins along its whole length, so that the outer surface of the pitcher thus formed was always the under surface of the leaf. But it resulted also from the complete cohesion of the margins of this organ that no aperture allowed of any communication between the outward air and that inclosed in its cavity. Nevertheless a flower and its peduncle were inclosed in this cavity, and the perianth was not less finely coloured through this envelope than are the petals of *Papaver rhoeas* under the thick tunics of their caducous calyx. As the flower developed, it was necessary that the peduncle should grow larger, which it did to a greater degree than the ascidimorphous leaf, which remained small; but then it was also necessary that the peduncle should twist itself or that the ascidium should burst. The peduncle prevailed, and the ascidium opened; but not, as would have been supposed, by a longitudinal rupture occasioned by a dislocation of the cohering margins, but by another very curious way of dehiscence. The ascidium formed an elongated bag, tumid in the middle, tapering at its two extremities, above and below: now this bag was split across with a horizontal rupture, just as in the ascidium the lid is detached from the pitcher, or rather as in mosses the calyptra falls off from the urn. The flower indeed carried this cap with it and could not rid itself of it, so that the perianth remained curled up beneath and within. At sight of this tulip, having at its base a conical foliaceous hollow body, from the centre of which arose a long peduncle, terminating in its turn in

another cone, which disclosed the organs of fecundation, I could not help comparing it to a large moss armed with its calyptra.

In *Nepenthes* and *Sarracenia* the ascidia also are at first shut up, and at Edinburgh, upon the beautiful plants of *Nepenthes*, cultivated with so much skill by Mr. MacNab, I was able to learn how their dehiscence takes place. The part which the circular struma acts, with its numerous small transverse ribs, then becomes very easy to understand. Before the operculum is detached its thin margins are folded round this struma, which holds them very strongly fixed, as a bladder is fastened over the opening of a vessel by the inflected margin.

When once the operculum is freed it cannot again fasten itself above the struma. This dehiscence of the lid is therefore horizontal or in a small degree oblique, like the direction of the struma itself, and it is nearly the same in all ascidia. On that of the tulip formed by monstrosity, the opening, although in this case it was an actual rupture caused by internal violence, took place notwithstanding in the same manner. This comparison deserves some attention, especially if further observations tend to confirm it.

The other accidental ascidium which I had the pleasure of seeing among the preparations of the Rev. Mr. Hincks, was of a kind altogether singular. It belonged to the *Polygonatum multiflorum*; but it had not shown itself, like that which I had myself gathered upon the same species of plant, at the upper part of the plant, but at the lower part of it. It was an encasing of three ascidia one in the other, through the centre of which passed the stalk, which when once free above them had become covered with its usual leaves and flowers in their normal form. Imagine therefore a foliaceous pitcher ending in two lateral and opposite auricles, serving as a case to two other pitchers which also have two opposite auricles, and above them a bunch of leaves and flowers, and we shall have a representation of this beautiful monstrosity, of this curious anomaly. Here again the outer surfaces of the ascidia were the under surfaces of the leaves, so that this condition never contradicts itself, and thus it acquires the value of a well-established law. It is always the carpellary state which is repeated, the floral

structure which is shown, and thus the ascidium is always a dependence, a result of the retrograde metamorphosis. It appears to me that these are facts irrevocably added to the study and science of vegetable monstrosities.

But what rendered the ascidium of the *Polygonatum* of Mr. Hincks to me extremely curious, was to see it composed of two leaves instead of one. The two terminal auricles, which were in extent about a quarter of the total length of the ascidium, are in fact the tops of the two leaves, which by their cohesion had formed these ascidia; each of these auricles corresponded with a principal nerve. The leaves of the *Polygonatum*, instead of originating at different heights, are here almost perfectly opposite; they have then cohered two by two at their margins, which were primitively and normally free, so as to make a common cavity of their upper surfaces. This same fact is repeated in three successive pairs.

This binary origin of the ascidium is, I believe, unique in the known cases of monstrosity, and in spite of its apparent deviation it comes within the general law in the most complete manner: the lower surface of the leaf remains the outside; it is the blade which has formed the pitcher; and the latter is only owing to a cohesion of the margins. These three circumstances, which are in perfect accordance with what I have before established, are worthy of remark.

Hence it is evident that the following classification may be established amongst the *anomalous ascidia* hitherto observed:

The ascidia are either formed of one leaf only or of several;

The *monophyllous* are the first;

The *polyphyllous* the second.

A. The *monophyllous ascidia*, are, 1. either *sarraceniform* when they are formed by a leaf cohering at its margins to form a pitcher, so that the blade exceeds the aperture of the urn at its summit as the opercular blade does in *Sarracenia*. The ascidia of *Vinca rosea* and *Polygonatum* mentioned in my former paper belong to this class of ascidia.

2. Or *calyptrimorphous*, when they are formed by a leaf cohering at its margins, but the upper part of which is detached horizontally, as in the *Tulipa gesneriana* of Mr. Hincks. This form, instead of reminding us of the *Sarracenia*, ap-

proaches nearer to *Nepenthes*, where the dehiscence of the operculum and of the pitcher is also horizontal or very nearly so. Only here the operculum continues, whilst elsewhere it is removed.

B. The *polyphyllous ascidia* are formed of several leaves. Up to the present time diphyllous alone have been observed, but the study of the conditions in which they arise evidently proves that there is great probability of our finding triphyllous, tetraphyllous, pentaphyllous, and in short polyphyllous, especially in plants where the leaves are verticillate.

It is thus that a just appreciation of things anticipates ulterior discoveries, and it is the best proof that a *science of observation* is quite as exact as a *science of calculation*.

XLV.—*Descriptions of British* Chalcidites. By Francis Walker, F.L.S.

[Continued from p. 182.]

Sp. 59. Cirrospilus Rapo. *Viridis aut cyaneus, abdomen cupreum, antennæ nigræ aut piceæ, pedes picei, tarsi pallidiores, femora cyanea, alæ limpidæ.*

Mas. Viridi-cyaneus: oculi et ocelli rufi: antennæ nigræ; articuli 1^{us} et 2^{us} nigro-cyanei: abdomen nigro-cupreum: pedes picei; coxæ virides; genua fulva; tarsi flavi, apice fusci; propedum tibiæ fuscæ, tarsi fulvi: alæ limpidæ; squamulæ piceæ; proalis nervi fusci, metalis fulvi.

Fem. Cyaneus: antennæ nigro-piceæ; articuli 1^{us} et 2^{us} cyanei: pedes coxis et femoribus nigro-cyaneis. (Corp. long. lin. $\frac{2}{3}$; alar. lin. 1.)

Var. β. *Fem.*—Meso- et metatarsi fusci, basi fulvi.

Var. γ. *Fem.*—Abdomen cyaneo-varium: pedes nigro-cyanei; trochanteres picei; genua flava; tibiæ piceæ; tarsi fusci; protibiæ fuscæ, basi supra fulvæ.

Var. δ. *Fem.*—Obscure viridis: antennæ nigro-piceæ; articuli 1^{us} et 2^{us} virides: abdomen cyaneo-cupreum; trochanteres fulvi, tarsi fulvi, apice fusci; protarsi obscuriores.

Found near London.

Fem. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum: antennæ clavatæ, corporis dimidio breviores; articulus 1^{us} gracilis, sublinearis; 2^{us} longicyathiformis; 4^{us} 3° brevior; 5^{us} adhuc brevior; clava fusiformis, acuminata, articulo 5° duplo longior: thorax brevi-ovatus, convexus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ bene determinatæ; scutellum brevi-conicum: metathorax transversus, mediocris: petiolus brevissimus: abdomen longiovatum, tho-

race multo longius vix latius, supra planum, subtus carinatum, apice acuminatum : pedes graciles : proalæ latæ ; nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

Sp. 60. Cirr. Aristæus, Fem. *Cyaneo-viridis, abdomen cupreum, antennæ piceæ, pedes fusco-picei, femora viridia, alæ limpidæ.*

Cyaneo-viridis : oculi et ocelli rufi : antennæ piceæ ; articuli 1^us^ et 2^us^ virides : abdomen cupreum, apice viridi-varium : pedes virides ; trochanteres fulvi ; genua fulva ; tibiæ piceæ ; tarsi pallide fusci ; protibiæ fulvæ : alæ limpidæ ; squamulæ piceæ ; nervi fusci. (Corp. long. lin. $\frac{2}{3}$; alar. lin. 1.)

Var. β.—Tibiæ fuscæ ; protibiæ pallide fulvæ.

May ; Hampshire.

Fem. Corpus sublineare, nitens, scitissime squameum, parce hirtum : caput transversum, breve, convexum, juxta thoraci latum : antennæ subclavatæ, corporis dimidio non longiores ; articulus 1^us^ gracilis, sublinearis ; 2^us^ longicyathiformis ; 4^us^ 3° brevior ; 5^us^ adhuc brevior ; clava fusiformis, acuminata, articulo 5° duplo longior : thorax ovatus, convexus : prothorax brevissimus, supra vix conspicuus : mesothoracis scutum latitudine longius ; parapsidum suturæ bene determinatæ ; scutellum breviconicum : metathorax transversus, mediocris : petiolus brevissimus : abdomen fusiforme, thorace multo longius, fere angustius, supra planum, subtus carinatum, apice attenuatum : pedes graciles : proalæ mediocres ; nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

Sp. 61. Cirr. Rhipheus, Fem. *Viridis æneo-varius, abdomen cupreum, antennæ piceæ, pedes picei, tarsi fulvi, alæ limpidæ.*

Nigro-viridis : oculi et ocelli rufi : antennæ piceæ ; articuli 1^us^ et 2^us^ virides : abdomen cupreum : pedes picei ; coxæ virides ; genua fulva ; tarsi fulvi, apice fusci ; propedum femora apice fulva, tibiæ fulvæ, tarsi obscuriores : alæ limpidæ ; squamulæ piceæ ; nervi fusci. (Corp. long. lin. $\frac{2}{3}$—$\frac{3}{4}$; alar. lin. 1—$1\frac{1}{4}$.)

Var. β.—Antennæ nigro-piceæ : femora viridia.

Var. γ.—*Var.* β. similis : abdomen viridi-varium.

Var. δ.—*Var.* β. similis : thorax æneo-viridis.

Found near London.

Fem. Corpus sublineare, nitens, scitissime squameum, parce hirtum : caput transversum, breve, convexum, juxta thoraci latum : antennæ subclavatæ, corporis dimidio longiores ; articulus 1^us^ gracilis, sublinearis ; 2^us^ longicyathiformis ; 4^us^ 3° brevior ; 5^us^ adhuc brevior ; clava fusiformis, acuminata, articulo 5° duplo longior : thorax ovatus, convexus : prothorax brevissimus, supra vix conspicuus : mesothoracis scutum latitudine longius ; parapsidum suturæ bene determinatæ ; scutellum breviconicum : metathorax transversus, mediocris : petiolus brevissimus : abdomen longiovatum, thorace angustius et multo longius, supra planum, subtus carinatum, apice attenuatum ; segmentum 1^um^ magnum ; 2^um^ et sequentia breviora, transversa : pedes graciles ; tarsis articuli 1° ad 3^um^ curtantes, 4^us^ 3° longior : proalæ latæ ; nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

Sp. 62. Cirr. Sotades, Fem. *Cyaneo-viridis, abdomen cupreum, antennæ piceæ, femora viridia, tibiæ fulvæ, tarsi flavi, alæ limpidæ.*

Cyaneo-viridis: oculi et ocelli rufi: antennæ piceæ; articuli 1^{us} et 2^{us} virides: abdomen cupreum: pedes virides; trochanteres fulvi; genua flava; tibiæ fulvæ; tarsi flavi, apice fusci; protarsi fulvi: alæ limpidæ; squamulæ piceæ; nervi pallide fusci. (Corp. long. lin. $\frac{2}{3}$; alar. lin. 1.)

Found near London.

Fem. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum: antennæ subclavatæ, corporis dimidio non longiores; articulus 1^{us} gracilis, sublinearis; 2^{us} longicyathiformis; 4^{us} 3° brevior; 5^{us} adhuc brevior; clava fusiformis, acuminata, articulo 5° duplo longior: thorax ovatus, convexus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ bene determinatæ; scutellum brevi-conicum: metathorax transversus, mediocris: petiolus brevissimus: abdomen fusiforme, thorace angustius et multo longius, supra planum, subtus carinatum, apice attenuatum: pedes graciles: proalæ mediocres; nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

Sp. 63. Cirr. Anyta, Fem. *Cyaneo-viridis, abdomen cupreum, antennæ fuscæ, pedes picei, femora viridia, alæ limpidæ.*

Cyaneo-viridis: oculi et ocelli rufi: antennæ pallidæ fuscæ; articuli 1^{us} et 2^{us} virides: abdomen cupreum: pedes picei; coxæ virides; femora viridia; genua fulva; tarsi basi fulvi; propedum tibiæ obscure fulvæ, tarsi fusci: alæ limpidæ; squamulæ piceæ; nervi fulvi. (Corp. long. lin. $\frac{1}{2}$; alar. lin. $\frac{3}{4}$.)

Var. β.—Antennæ obscure fuscæ.

Found near London.

Fem. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum: antennæ subclavatæ, corporis dimidio longiores; articulus 1^{us} gracilis, sublinearis; 2^{us} longicyathiformis; 4^{us} 3° brevior; 5^{us} adhuc brevior; clava fusiformis, acuminata, articulo 5° duplo longior: thorax ovatus, convexus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ bene determinatæ; scutellum breviconicum: metathorax transversus, mediocris: petiolus brevissimus: abdomen fusiforme, thorace longius et angustius, supra planum, subtus carinatum, apice attenuatum et acuminatum: pedes graciles: proalæ latæ; nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

Sp. 64. Cirr. Rhœsus, Fem. *Viridis cupreo-varius, antennæ piceæ, pedes fulvi, femora viridia, alæ limpidæ.*

Obscure viridis cupreo-varius: oculi et ocelli rufi: antennæ piceæ; articuli 1^{us} et 2^{us} virides, hic apice et subtus fuscus: abdomen cupreum, cyaneo-viridi-varium: oviductus vaginæ nigræ: pedes fulvi; coxæ virides; femora viridia, apice flava; tarsi apice fusci; protarsi obscuriores: alæ limpidæ;

squamulæ piceæ; nervi proalis fusci, metalis flavi. (Corp. long. lin. 1; alar. lin. $1\frac{1}{2}$.)

Found near London.

Sp. 65. Cirr. Alcithoe, Fem. *Viridis aut cyaneus, præcedente minor gracilior, abdomen cupreum, antennæ piceæ, pedes fusci aut fulvi, femora cyanea, alæ limpidæ.*

Nigro-viridis: oculi et ocelli rufi: antennæ piceæ; articuli 1^{us} et 2^{us} nigro-cyanei: abdomen nigro-cupreum: pedes cyanei; trochanteres fulvi; genua fulva; tibiæ fuscæ, basi fulvæ; tarsi fulvi, apice fusci; propedum tibiæ fulvæ, tarsi fusci: alæ sublimpidæ; squamulæ piceæ; proalis nervi fusci, metalis flavi. (Corp. long. lin. $\frac{3}{4}$; alar. lin. 1.)

Var. β.—Antennæ nigro-piceæ; articuli 1^{us} et 2^{us} nigro-ænei: pedes fulvi; coxæ nigræ; femora nigra; metatibiæ fuscæ; tarsi flavi, apice fusci: protarsi fulvi.

Var. γ.—Nigro-cyaneus: pedes nigro-cyanei; trochanteres fusci; genua flava; tibiæ fulvæ; tarsi flavi, apice fusci; protarsi fulvi.

July; near London.

Sp. 66. Cirr. Phalis, Fem. *Nigro-cupreus, antennæ fuscæ, pedes picei, femora cuprea, alæ limpidæ.*

Nigro-cupreus: oculi et ocelli rufi: antennæ fuscæ; articuli 1^{us} et 2^{us} nigro-cuprei: abdomen cupreum: oviductus vaginæ nigræ: pedes cuprei; trochanteres fulvi; genua fulva; tibiæ piceæ; tarsi fusci: alæ limpidæ; squamulæ piceæ; nervi fulvi. (Corp. long. lin. $\frac{2}{3}$; alar. lin. 1.)

July; near London.

Fem. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum: antennæ clavatæ, corporis dimidio longiores; articulus 1^{us} gracilis, sublinearis; 2^{us} longicyathiformis; 4^{us} 3^{o} brevior; 5^{us} adhuc brevior; clava fusiformis, acuminata, articulo 5^{o} duplo longior: thorax ovatus, convexus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ bene determinatæ; scutellum brevi-conicum: metathorax transversus, mediocris: petiolus brevissimus: abdomen longiovatum, thorace longius vix latius, supra planum, subtus carinatum, apice acuminatum: proalæ latæ; nervus ulnaris humerali longior, radialis vix longior, cubitalis sat longus.

Sp. 67. Cirr. Zenocia, Fem. *Ater, abdomen cupreum, antennæ fuscæ, pedes nigri, tarsi pallidiores, alæ limpidæ.*

Ater: oculi et ocelli rufi: antennæ fuscæ; articuli 1^{us} et 2^{us} atri, hic apice fuscus: abdomen nigro-cupreum: pedes nigri: trochanteres fulvi; genua fulva; tarsi fulvi, apice fusci; propedum femora apice fulva, tibiæ fulvæ, tarsi fusci: alæ limpidæ; squamulæ piceæ; proalis nervi fusci, metalis flavi. (Corp. long. lin. $\frac{2}{3}$; alar. lin. 1.)

Var. β.—Tarsi picei, basi flavi.

July; near London.

Sp. 68. Cirr. Lysippe, Fem. *Ater præcedente multo minor, abdomen cupreum, antennæ fuscæ, pedes fusci, tarsi fulvi, alæ sublimpidæ.*

Ater: oculi et ocelli rufi: antennæ fuscæ; articuli 1^{us} et 2^{us} picei: abdomen nigro-cupreum: pedes fusci; coxæ nigræ; trochanteres fulvi; genua fulva; tarsi fulvi, apice fusci; protarsi obscuriores: alæ sublimpidæ; squamulæ fulvæ; proalis nervi fulvi, metalis flavi. (Corp. long. lin. $\frac{1}{3}$—$\frac{1}{2}$; alar. lin. $\frac{3}{5}$—$\frac{3}{4}$.)

July; near London.

Fem. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum: antennæ clavatæ, corporis dimidio longiores; articulus 1^{us} gracilis, sublinearis; 2^{us} longicyathiformis; 4^{us} 3^{o} brevior; 5^{us} adhuc brevior; clava fusiformis, acuminata, articulo 5° duplo longior: thorax breviovatus, convexus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ bene determinatæ; scutellum brevi-conicum: metathorax transversus, mediocris: petiolus brevissimus: abdomen longiovatum, thorace multo longius vix latius, supra planum, subtus carinatum, apice acuminatum: pedes graciles: proalæ latæ; nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

Sp. 69. Cirr. Achæmenes, Fem. *Æneus aut viridis, abdomen cupreum, antennæ piceæ, pedes fusci, femora ænea, tarsi flavi, alæ limpidæ.*

Nigro-æneus: oculi et ocelli rufi: antennæ piceæ; articulus 1^{us} nigro-æneus: abdomen cupreum: pedes flavi; coxæ nigro-æneæ; femora nigro-ænea; tibiæ fuscæ; tarsi fulvi, apice fusci; propedum femora apice flava, tibiæ fulvæ, tarsi pallide fusci: alæ limpidæ; squamulæ piceæ; nervi fulvi. (Corp. long lin. $\frac{2}{3}$; alar. lin. 1.)

Var. β.—Nigro-viridis, abdomen cupreum.

Var. γ.—Mesotibiæ basi flavæ.

Found near London.

Mas. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum: antennæ filiformes, corporis longitudine, pilis longis vestitæ; articulus 1^{us} longiovatus, latus; 2^{us} longicyathiformis; 3^{us} brevis; 4^{us}, 5^{us} et 6^{us} longi, lineares; clava longi-fusiformis, acuminata, articulo 6° duplo longior: thorax ovatus, convexus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ bene determinatæ; scutellum breviconicum: metathorax mediocris, transversus: petiolus brevissimus: abdomen sublineare, planum, thorace brevius fere angustius: pedes graciles: proalæ angustæ; nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

[To be continued.]

XLVI.—*On two South African Genera of the Natural Order* Passifloreæ, *with two Plates, from Drawings made by* The Hon. W. H. Harvey, of the Cape of Good Hope.

Since the publication of his very useful 'Genera of South African Plants,' our valued friend Mr. Harvey has not ceased to collect and draw and make notes upon new or rare species of plants of that interesting country, and we have now before us many excellent representations and remarks which he has kindly communicated to us. Two of these, which appear particularly deserving of a place in these 'Annals,' are the *Acharia tragoides*, Thunberg, and *Ceratiosicyos Echlonii* of Nees von Esenbeck.

1. Acharia tragoides, *Th.*

(Plate IX.)

We shall give the generic character of this in the words of Dr. Arnott, who has examined with great attention specimens lately sent to him, and which it will be seen differ remarkably from that of Thunberg.

Gen. Char.—*Flores* monoici. Masc. *Perianthium* tubuloso-campanulatum, 3-lobum, basi bracteolis tribus parvis cinctum. *Stamina* 6, triadelpha. *Filamenta* subulata, apice dilatata, et ibi antheras duas 2-loculares anticas ferentia. Fœm. *Perianthium* paullo ultra medium trifidum, basi tribracteolatum, in fructu increscens. *Ovarium* uniloculare, rostratum. *Styli* 3 (potius 1, tripartitus) bifidi. *Stigmata* 6, flabelliformia, membranacea. *Capsula* (brevi-pedicellata) 1-locularis, 3-valvis, 1- (vel rarius 2- aut 3-) sperma, valvis margine (post dehiscentiam) involutis, rostro styloque acuminatis. *Semen* ovoideum, arillo parvo unilaterali basi instructum. *Embryo* cylindricus, in axi albuminis carnosi et dimidio brevior. *Cotyledonus* radiculaque æquilongæ. *Arn. Mst.*

Herba *erecta gracilis*. Folia *alterna petiolata, exstipulata, profunde trifida, lobis oblongo-lanceolatis, acutis, cuneatis, incisis*. Flores *axillares, subbini, cernui, brevi-pedunculati.*

Acharia tragoides. *Th. Fl. Cap.* p. 37. *Harv. Gen. S. Afr. Pl., App.* p. 409.

Hab. Uitenhage, *Thunberg, Zeyher.*

Mr. Harvey, in his 'South African Flora', judging from Thunberg's description alone, thought this genus might belong to *Euphorbiaceæ* or *Urticeæ*; but now that he has received spe-

cimens from Mr. Zeyher, he is satisfied it should be referred to *Passifloreæ*, in which Dr. Arnott agrees, but remarks, that if this and *Ceratosicyos* and *Paschanthus* and *Modecca* be united to *Passifloreæ*, the definition of the order will require to be modified and enlarged. The parts of the flower in *Acharia*, Mr. Harvey observes, vary from 3 to 4; and it may be stated, that what Dr. Arnott calls involucral *bracteas*, Mr. Harvey considers a *calyx*.

Plate IX. *Acharia tragoides*. Fig. 1. male flower; 2. front view of the same; 3. involucre; 4. perianth laid open; 5. glands from the base of the perianth; 6. 7. stamens; 8. single anther; 9. female flower; 10. pistil with glands; 11. stigmas; 12. pedicellate capsule; 13. opening capsule; 14. valve with seeds; 15. seed, magnified.

2. Ceratosicyos Echlonii, *N. ab E.*

(Plate X.)

Ceratosicyos Echlonii. *Nees ab Esenb. in Enum. Pl. Afr. Austr.* p. 281. *Harv. Gen. S. Afr. Pl.* p. 107.

Hab. Woods, Krakakamma, Adom and Oliphants-hook, also in Albany and Kafrland, *Echlon* and *Zeyher*.

As the learned Professor Nees von Esenbeck has, in the work above quoted, given a full generic and specific description of this plant, we shall here content ourselves with mentioning the particulars in which Mr. Harvey finds a difference from what is related by the German author. "The glands," Mr. Harvey remarks, "are *outside* the staminal cup, as in all the order, and the *stamens* are always as numerous as the clefts, sometimes, as represented in our figure, combined in pairs irregularly. I have dissected off the ring of the stamens, leaving the glands still attached to the calyx, a pretty good proof that I am not deceived. The parts are often only four, as in *Acharia*. The glands are surely in both flowers abortive stamens, exactly similar to those of *Modecca* and the rays of *Passiflora*."

Plate X. *Ceratosicyos Echlonii*. Fig. 1. male flower; 2. corolla of the same laid open; 3. stamen; 4. section of anther; 5. capsule; 6. female flower; 7. corolla of the same laid open; 8. pistil; 9. stigma; 10. portion of an ovary laid open to show the attachment of the ovules: magnified.

XLVII.—*List of Fossil Mammifera from the Basin of the Rio das Velhas, with an extract of some of their distinguishing Characters.* By Dr. Lund*.

Edentata.

M. Lund describes a *Myrmecophaga* of the size of an ox (*Myrm. gigantea.*)†.

Effodientia.

Two species of *Dasypus*; one allied to *D. octocinctus*, but with the mouth shorter; and the other twice as large as the living species, with the plates of the shield deeply punctuated (*D. punctatus*).

Xenurus, Wagl. A species allied to *X. nudicaudis*, a living species established by M. Lund.

Eurodon, Lund. An extinct genus of Armadillo, characterized by the teeth being transversally compressed. M. Lund is only acquainted with a single species, of the size of a small pig.

A *Heterodon*, Lund., another lost genus of the same family, distinguished from all the living Armadillos by the proportion of its teeth: the species which served as the type was of the size of a rabbit.

A *Chlamydotherium*, Lund., a new genus of the same family. Nearly all the parts of the skeleton have been investigated by the author, and it proves to be very interesting from its establishing connexions between the various groups of existing Armadillos, and also by the affinities it presents to the *Bradypoda*.

The *Chlamydotherium* represents on a grand scale the genus *Euphractus*, Wagl. M. Lund is acquainted with two species, one dedicated to M. von Humboldt of the size of a Tapir; the other, named *giganteum*, equaled in size the largest Rhinoceros.

An *Hoplophorus*, a genus very extraordinary from the heavy proportions of its species and their gigantic size, as well as from the remarkable combination of different types of organization: their characters however bring them more and more near to the *Bradypoda*. These curious animals were provided with a shield, which covered all the upper parts of the body, and which consisted of small hexagonal plates, except towards the middle of the body, where these plates take a square form and are arranged in fixed transversal bands. The bones of the trunk as well as the large bones of the extremities are

* From an extract given by Victor Audouin, to whom the letter was addressed, in the Comptes Rendus, No. 15, Avril 1839. The first or introductory part of this paper appeared at p. 235 of the present volume.

† Among the fossils brought to England from South America by Mr. Darwin there is a fragment of the cranium of an animal as large as an ox, and which Mr. Owen has described under name of *Glossotherium*, considering it to have had the same habits and food as the Anteaters, to which it was very closely allied, but not generically identical.—Ed.

moreover very similar to those of the Armadillos, but especially to those of the *Cachicames*, but the bones composing the feet are shortened to such a degree, and present so considerable a flattening of the articular surfaces, that nothing similar is found to occur in any animal skeleton; and it is difficult to conceive how such feet could serve to burrow in the earth: moreover the form of the teeth indicates that these curious animals fed solely on vegetable substances, and we must suppose that they grazed in the same manner as the large *Pachydermata*. Be this as it may, the *Hoplophorus*, two species of which are distinguished, offer this peculiarity, that their zygomatic arch is furnished with a descending branch—a character hitherto regarded as belonging exclusively to the *Bradypoda*. Both species were of the size of an ox. Fragments of these skeletons have already been described by Prof. Weiss of Berlin*. M. Lund has also discovered some fragments belonging to a genus allied to the preceding one, and to which he assigns the name *Pachytherium*. Its proportions are still heavier and its size larger. He calls this species *Pachytherium magnum*.

Bradypoda.

M. Lund thus comes to the family of the *Bradypoda*, which in these countries performed a very important part during the antediluvian epoch from the number and variety of its forms and the large size attained by the species.

The first genus examined is the *Megalonyx*, which is related to the Armadillos by the osseous plates which covered a portion of the body; but these plates, besides being of an immense size, and far from forming a continuous shield as in them, are separated by great intervals from each other.

The *Megalonyx* offers the greatest relations to the *Megatherium* principally in the structure and composition of the feet; but the hinder ones present the same torsion as the feet of *Bradypus tridactylus*, although arising from a different cause. In the Aï this torsion is produced by the peculiar mode of articulation of the leg with the astragalus; in *Megalonyx*, according to M. Lund, this articulation is formed in the usual way, and it is the carpian [tarsal] surface† of the

* Mr. Owen has described in detail the structure of the dental organs and the bones of the extremities of a species of this genus, to which he assigned the name of *Glyptodon*, in reference to the sculptured form of the teeth. As this description was read before the Geological Society in March, 1839 (see 'Proceedings of the Geological Society', No. 62.), the name of *Glyptodon* must take precedence of that proposed by Dr. Lund for the same extinct genus in his memoir, of which the present extract was not published until the following month.—Ed.

† We presume that the term "la face *carpienne*" is an oversight in the original Memoir.—Ed.

latter bone which by its anomalous conformation produces the contortion of the plane of all the rest of the foot.

The molars, to the number of 5 above and 4 below, are not furnished with roots as in the animals of the order of Edentata; thus differing from those of the *Megatherium*, which are described as having two roots.

The species of *Megalonyx* were provided with an excessively strong tail, and probably prehensile, which together with the contortion of the plane of the hinder feet and the enormous length of the claws, must lead to the belief, observes M. Lund, that these animals, notwithstanding the great weight of their body, were destined to climb, like their representatives in the present creation.

This genus appears to have been very rich in species; M. Lund already distinguishes five; one of them, *M. Cuvierii*, was of the size of a large ox, and this was not the largest species.

A new genus would arrange itself by the side of *Megalonyx*, under the name of *Sphenodon*, which was of the size of a hog.

A new genus, designated by M. Lund by the name of *Cyclodon*, and containing one species, would come still closer to the *Bradypoda*.

Returning to the animals above enumerated, and which are comprised in Cuvier's order Edentata, M. Lund observes: 1. That the family of the *Myrmecophaga*, that of the *Dasypoda*, and that of the *Bradypoda*, which, at the present period, are peculiar to America, also existed there at the preceding epoch. 2. That at that period these families were peculiar to this portion of the globe exclusively, as they are at present, and the cause of this opinion is that no species of these three families has been hitherto discovered in the diluvian deposits of other portions of the earth. 3. That this large order of Edentata was at that time more numerous both in genera and species than at the present day. 4. That most of these mammiferous genera which formerly inhabited the country have disappeared. 5. That all then existing species have been destroyed, only two species presenting some affinity, but not a perfect identity with living species. 6. And lastly, that the animals of this order at this period attained dimensions far more considerable than at present occurring.

The family of the *Bradypoda* have disappeared entirely from the basin of the Rio das Velhas, which would be accounted for by the absence of primæval forests, all the country being occupied by that form of vegetation termed by the Brazilians *Campos*. It is probable that at the period during which these large animals lived it was quite different, and that the country was then covered with immense forests: still, however, everything leads us to suppose that they led the same kind of life as their representatives of the present period,

i. e. that notwithstanding their colossal dimensions they sought their food in trees.

PACHYDERMATA.

This family was more numerous at those times than at present. M. Lund mentions a species of Tapir, four species of Pecari, and moreover a Mastodon, equaling in size that of an Elephant.

RUMINANTIA.

The family of Ruminants, which is represented in this country by the sole genus *Cervus*, possessed at this ancient period, besides the genus *Cervus*, of which two fossil species are met with, an antelope and two generic types which have no representatives; they are distinguished by the names of *Auchenia** and *Leptotherium*. M. Lund is acquainted with two species of each of these genera.

FERÆ.

The Carnivora were not less numerous or varied in those times than the Ruminants. There were three species of *Felis*, two species of *Canis*, a bear, and what is most remarkable, a species belonging to the genus *Cynailurus* of Wagler, or *Guepardus* of M. Dumortier, which is peculiar to the old world, and which at that period occurred in the new world. M. Lund also notices a jackal, which will constitute a new genus under the name of *Speothos*, one species of Coati, another of the genus *Eirara*, and lastly, what will appear most surprising, a hyæna, which to his great astonishment he found with remains of Pacas, of Agoutis, of Pecari, of *Megalonyx*, and other American forms. The species which he calls *H. Neogæa* equals in size the largest living species of hyæna.

MARSUPIALIA.

The diluvian deposits of the caverns of Brazil are filled with fragments of Marsupials of the genus *Didelphys*, amongst which seven species may be distinguished, five of which bear more or less analogy to recent species of this country, while the two others exhibit not a trace of resemblance. A new genus will arrange itself by the side of *Didelphys* which appears to have been of the size of a Jaguar, and seems to represent the great species *Dasyurus* of New Holland. M. Lund assigns the name of *Thylacotherium*† to it.

GLIRES.

This family was not less remarkable than the former by the va-

* The term *Auchenia*, having already been applied by Illiger to the existing Llamas, and Vicuguas, cannot be retained for the extinct genus discovered by Dr. Lund.—EDIT.

† This term has been applied to one of the extinct Marsupial genera of the Stonesfield oolite. See the present volume of 'Annals', p. 61.—EDIT.

riety of forms and by the large size of the species. M. Lund notices and describes, in this family alone, twenty-one species, several of which constitute new genera; he states that he possesses a vast number of fossil remains, which he has not had time hitherto to study in detail.

All the families hitherto passed in review have shown a superiority in number of species, and especially of genera, in favour of the antediluvian period. This is not the case for the two remaining families, the *Cheiroptera* and the *Simiæ*.

CHEIROPTERA.

With regard to the *Cheiroptera*, says M. Lund, it is but recently that I succeeded in discovering some few remains among the millions of bones of small animals contained in the deposits of some caverns. The heaps of recent bones which are frequently found in the caverns, arising as I have above observed from remains of animals dragged into them by the *Strix perlata*, contain bones of *Cheiroptera* in greater number, and it might lead one to conclude that this family was in fact less numerous in the ancient periods than it is at present. However, as several circumstances lead me to believe that it was by a diurnal bird of prey that the heap of the small fossil bones was formed, this explains, as I shall subsequently show, why the bones of animals of the family in question are more rare amongst them than in the heaps of recent bones.

SIMIÆ.

The existence of *Simiæ* at periods previous to the present order of things was a fact yet new to science, when I discovered in the month of July 1836, the first fossil remains of an animal of this family. Since then I have learnt that their presence has been confirmed in Europe and in Asia. I possess fossil bones of two species of this family, one of which, that will not come under any of the existing genera, attained the height of four feet (*Protopithecus brasiliensis*): the other approaches considerably to the genus *Callithrix*, exceeding it by a height of twice that of the species living at the present day (*Callithrix primævus*).

I shall conclude by observing that hitherto I have found no trace of the existence of man at this period.

This rapid glance will suffice to show that the torrid zone of our globe, far from having been uninhabited during the period preceding the now existing state of things, possessed, on the contrary, an animal creation more numerous, more varied, and more gigantic, than that which it sustains at present.

We also see that South America possessed at that period the same

animal forms which now characterize it: the Myrmecophaga, the Armadillos, the Pecari, the Coati, the Opossums, the *Loncheres*, the Coendous, the Agontis, the Pacas, the Capibaras and others. But, notwithstanding this analogy in the general type, it appears that the species of the two periods are different; at least M. Lund knows at present but of one single exception to this rule (*Loncheres elegans*).

If we combine, says M. Lund in concluding, this fact with the geological facts above alluded to; if we remember that all the country in question, elevated 2000 feet above the level of the sea, is covered with a continuous and great stratum of loose soils which extend equally and without any interruption over plains, valleys, and hills, and which is not missing even on the table lands and gentle slopes of the highest mountains (5000 to 6000 feet); if we consider that this stratum contains subjacent beds of gravel and stones which fill all the fissures and caverns of the limestone rocks, and, that lastly, it contains numerous remains of animals differing from those which at the present day inhabit this country; if, I say, we combine these facts, we can hardly refuse seeing proofs the most irrefragable of a great irruption of waters, which, covering all this portion of the globe, put an end to the beings then inhabiting it.

XLVIII.—*Enumeration of Plants collected by* Mr. Schomburgk, *British Guiana.* By George Bentham, Esq., F.L.S.

[Continued from vol. ii. p. 451.*]

LEGUMINOSÆ.

Tribe Loteæ, *DC.*

If we commence the long series of *Leguminosæ* with the *Papilionaceæ*, the tribe of *Podalyrieæ* might be placed first, removing the true *Sophoreæ* to the end, as forming the intermediate link between *Papilionaceæ* and *Cæsalpinieæ*. The vast tribe of *Loteæ* might come next, divided into sub-tribes nearly in the order proposed by DeCandolle, but with a few modifications of detail.

Sub-tribe Genisteæ, *DC.*

Monadelphous stamens, and simple or palmate leaves, are the chief characteristics of this group, and admit of few if any exceptions. The anthers are also frequently dissimilar, five being oblong and attached near the base, and five alternate ones shorter and attached towards the centre. There do not appear ever to be either stipellæ to the leaves, a vaginal disk round the ovarium, nor trans-

* The plant erroneously described in the last paper as a new *Baccharis*, under the name of *Baccharis erioptera*, is the *Pterocaulon spicatum*. DC. Prod. v. p. 454.

verse dissepiments to the pods. They are usually low shrubs or perennial herbs, occasionally annuals, but seldom trees.

85. *Crotalaria stipularia.* Desv. Journ. Bot. 1814. ii. p. 76. DC. Prod. ii. p. 124.—C. Espadilla. *Humb. et Kunth, Nov. Gen. et Sp.* vi. p. 398. *DC. l. c.* Folia inferiora late ovalia, stipulis minimis breviter decurrentibus, superiora multo minora, ovali-oblonga v. lanceolata, stipulis maximis semi-sagittato-decurrentibus, parte libera triangulari falcata. In *C. sagittale* stipularum superiorum pars libera recta est lanceolata et divergens.—Savannahs, British Guiana. Schomburgk, n. 62.—French Guiana. Leprieur. Herb. Par. n. 9.—Brazil. Pohl.—Gardner, n. 959, &c.

86. *Crotalaria genistella.* Humb. et Kunth, Nov. Gen. et Sp. vi. p. 398. DC. Prod. ii. p. 124.—C. pterocaula. *Desv. l. c. DC. l. c.* Stipulæ superiores, parte libera brevissima obtusa, sæpe per internodia duo decurrent, et caulis sic anguste quadrialata est.—Moist Savannahs of the Rupunoony, British Guiana. Schomburgk.—Brazil. Pohl.—Peru. Mathews, n. 1935.

These two species belong to a section of *Crotalaria*, which may be called *Anarthrophyllum* and thus characterized:

Folia simplicia, sessilia v. in petiolo brevi non articulata. Flores racemosi. Calyces nunc profunde bilabiati bibracteolati, nunc subæqualiter 5-fidi nudi v. minute bibracteolati. Legumen calyce longius v. rarissime subbrevius.

For the arrangement of the numerous species the section contains, the groups proposed by Wight and Arnott (Prod. Fl. Penins. Ind. Or. p. 101 et seq.) appear to be natural, although they run much into one another. Most of the species of their five first groups and some of those of the sixth have a deeply bilabiate calyx, with the lips sometimes scarcely divided, and bracteolæ on each side often nearly equal to the calyx itself; whilst those of the remaining groups, with some species of the sixth, have a campanulate calyx, nearly equally five-cleft, and the bracteolæ very minute, often placed on the peduncle below the calyx; but the passage from the one to the other is too gradual and too unconnected with habit to be made use of in characterizing the groups.

To the *Alatæ*, to which both the above species belong, I should also refer several new Brazilian species, of which I subjoin the specific characters, reserving fuller descriptions for the 'Leguminosarum Genera et Species' which I am preparing.

C. Pohliana, fruticosa, rufo-villosa, foliis sessilibus ovalibus, stipulis superioribus decurrentibus, apice oblique truncatis, racemis terminalibus multifloris.—Rio Uruhu and Villa Boa. Pohl.

C. bracteosa, fruticosa elata, ramis glabris, stipulis superioribus latis petiolo adnatis decurrentibus, foliis ellipticis supra glabris subtus sericeo-villosis, racemis terminalibus multifloris, bracteis plerisque stipulatis.—Brazil. Lhotsky.

C. otoptera, elata, paniculato-ramosa, rufo- v. subsericeo-villosa, stipulis lanceolato-linearibus subfalcatis angustissime decurrentibus supra folium inferius in appendicem latam triangularem falcatam dilatatis, racemis subopositifoliis multifloris.—Oliveira and Caldas Novas. Pohl.

C. Vespertilio, elata, paniculato-ramosa, glaberrima, stipulis superioribus maximis late decurrentibus semi-ovatis cuneiformibusve, racemis lateralibus multifloris.—Ourofino and Santa Cruz, in Goyaz. Pohl.

C. divergens, herbacea, adpresse pubescens, divaricato-ramosa, foliis subsessilibus ovatis, stipulis plerisque anguste decurrentibus, apice rotundatis, nonnullis abortivis v. minimis, racemis oppositifoliis terminalibusque plurifloris.—Ourofino, in Goyaz. Pohl.

C. velutina, herbacea, erecta v. adscendens, pilis longis mollibus vestita, foliis sessilibus oblongis lanceolatisve basi subcordatis, stipulis superioribus parvis lanceolatis breviter decurrentibus, pedunculis oppositifoliis 1—2-floris.—Rio Uruhu, and between Bomfin and Caldas in Goyaz. Pohl.

The following new ones from the same country belong to the group of *Erectæ*:

C. virgata, erecta, elata, paniculato-ramosa, præter paginam inferiorem foliorum sericeam glabra, foliis exstipulatis oblongo-ellipticis utrinque angustatis, racemis multifloris, bracteis bracteolis segmentisque calycinis lato-lanceolatis acuminatis, leguminibus longe stipitatis glabris.—Minas Geraes. Pohl, Langsdorff.

C. foliosa, suffruticosa? erecta, tota pilis rufis subsericeis vestita, foliis subsessilibus exstipulatis obovatis oblongisve obtusis, racemis subterminalibus multifloris, bracteis bracteolisque lanceolatis acuminatis, corollis leguminibusque glabris.—Claros mountains. Pohl.

C. flavicoma, suffruticosa? erecta, tota pilis longis rufis vestita, foliis sessilibus ovatis subcordatis exstipulatis, racemis subterminalibus multifloris, bracteis bracteolisque lanceolatis acuminatis, corollis ovarioque glabris.—Serra da Chrystais. Pohl.

C. grandiflora, fruticosa? erecta, elata, pilis adpressis pubescens, foliis ovato- v. oblongo-ellipticis basi longe angustatis, racemis axillaribus terminalibusque plurifloris, bracteis bracteolisque lanceolatis acuminatis, calycibus amplis corollam æquantibus.—Near Cercado. Pohl.

C. divaricata, fruticosa, ramosissima, rufo-pubescens, foliis breviter petiolatis ovalibus, pedunculis brevibus axillaribus 1—2-floris, bracteis bracteolisque lineari-acuminatis, calycibus corolla parum brevioribus.—Rio Reazon. Pohl.

The genus *Chrysocalyx*, of Guillemin and Perottet, would much more naturally come in as a second section of *Crotalaria*, and the species with palmately-compound leaves, already referred to *Crotalaria*, would form the third section, which, containing the greater number of Linnæan species, may be called *Eucrotalaria*. I should exclude from it, however, several of E. Meyer's species which have not a truly inflate pod, and perhaps also those with a biovulated ovarium forming the genus *Clavulium* of Desvaux.

To the section *Eucrotalaria* belongs the following :

87. *Crotalaria leptophylla*, suffruticosa?, glabriuscula, foliis petiolatis trifoliolatis, foliolis oblongo-linearibus utrinque longe angustatis, racemis subterminalibus paucifloris laxis, bracteis bracteolisque minutis deciduis, calycibus corolla triplo brevioribus late campanulatis subæqualiter quinquefidis, laciniis lateralibus utrinque apice connatis, leguminibus glabris.—Savannahs of the Rupunoony. Schomburgk.—On the Rio Preto, in Brasil. Pohl. Petiolus semipollicaris v. interdum pollicaris. Foliolum intermedium 2—3-pollicare, lateralia breviora v. in foliis supremis nulla. Flores ampli *C. arborescentis*. Vexilli unguis appendiculatum villosum. Alæ valde plicatæ. Ovarium tenuiter pubescens.

Among the Brasilian species of this section, Pohl's collection, besides the above and the *C. incana* and *vitellina*, contains six new ones, and I have two or three others from other collectors. The most remarkable is the following :

C. unifoliolata, suffruticosa, glabra vel tenuissime adpresso-pubescens, foliis exstipulatis, foliolo unico ad apicem petioli articulato oblongo-elliptico, racemo terminali multifloro, bracteis minutissimis, calyce campanulato ebracteato semi quinque-fido, leguminibus sericeo-villosis.—Brasil. Schücht. Near Oretiro. Pohl.

It is impossible not to admit, with the younger Agardh, the close affinity to *Crotalaria* of the genus *Lupinus*, which indeed differs in nothing but the form of the pod. Among the simple-leaved species the *L. integrifolius*, Linn., and *L. Cochinchinensis*, Lour., must certainly be removed as not belonging to the genus, and the following three new Brasilian ones may be added, all allied to *L. villosus*, but specifically distinct :

L. velutinus, perennis, erectus v. basi decumbens, molliter et adpresse lanuginoso-villosus, foliis breviter petiolatis stipulatis oblongis ellipticisve acutis, basi angustatis, floribus dense spicatis, calycis bibracteolati labiis subintegris.—On the Rio San Francisco. Pohl.

L. subsessilis, perennis, decumbens, molliter et adpresse lanuginoso-villosus, foliis subsessilibus stipulatis ovali-oblongis acutis basi angustatis, floribus laxe spicatis, calycis bibracteolati labio superiore bifido inferiore subintegro. —Sierra da Chrystais. Pohl.

L. coriaceus, suffruticosus? ramis suberectis hirsutis, foliis exstipulatis sessilibus oblongo-linearibus basi angustatis subglabris coriaceis, spica laxiuscula, calycis bibracteolati labio superiore breviter bifido inferiore subintegro.—Near Tejuco, and in the Serra Frio. Vauthier, n. 141 and 142.

Subtribe Indigoferæ.

Having removed *Clitoria* and most of the genera included by De Candolle in his subtribe of *Clitorieæ* to *Phaseoleæ*, *Chætocalyx* being now known to be a *Hedysarea*, and *Psoralea* forming, with *Dalea*, *Petalostemon* and some others, a distinct subtribe under the name of

Psoraleæ, there remains *Indigofera,* which cannot well be associated with any other group of *Loteæ.* As at present constituted the genus would include *Hemispadon,* Endl., *Oustropis,* Don, and the Cape species of Reichenbach's *Bonjeania.* A revision however of the very numerous species contained in *Indigofera* may suggest the separation of some groups, especially the *Onobrychioidei* of Wight and Arnott, including *I. echinata* of those authors, and *I. acanthocarpa* of Lindley. *Cyamopsis* appears also to be referable to *Indigoferæ.*

88. *Indigofera pascuorum,* suffruticosa, erecta, canescens, foliis plerisque unifoliolatis nonnullis pinnatim 3—7-foliolatis, foliolis oppositis minute stipellatis oblongis mucronatis basi angustatis, racemis elongatis laxifloris, calycibus breviter pedicellatis corolla dimidio brevioribus, legumine recto continuo subtereti polyspermo, juniore canescente.—British Guiana. Schomburgk, n. 96. St. Domingo, Herb. Mus. Petrop.—Caules e basi crassa ramosa erecti, bipedales, tenues, paucifoliati. Racemi elongati. Flores mediocres, rosei.

The only other American species known to me with so small a number of leaflets are the following:

I. gracilis, Bongard MS., suffruticosa, erecta, canescens, foliis (omnibus?) unifoliolatis, foliolo elongato anguste lineare acuto, racemis elongatis laxifloris, calycibus breviter pedicellatis corolla dimidio brevioribus, legumine recto continuo subtereti polyspermo juniore canescente.—San Paulo, Brasiliæ. Herb. Mus. Petrop.

I. asperifolia, Bongard MS., suffruticosa, procumbens v. adscendens, subcanescens, foliis simplicibus 3—5-foliolatisve, foliolis oppositis stipellatis oblongis linearibusve mucronatis basi angustatis, racemis longe pedunculatis elongatis multifloris, calycibus subsessilibus laciniis corolla vix dimidio brevioribus, legumine continuo subtereti polyspermo, juniore canescente.—In campis ad Rio Pardo Brasiliæ. Herb. Mus. Petrop.

I. Pohliana, fruticosa? erecta, canescens, foliis 3—7-foliatis, foliolis oppositis vix stipellatis oblongis obovatisve mucronatis basi angustatis, racemis densis folio brevioribus, legumine continuo subtereti polyspermo juniore canescente.—In campis glareosis Brasiliæ. Pohl, Langsdorff, &c.

Subtribe Galegeæ, *DC.*

89. *Tephrosia toxicaria.* Pers. Syn. ii. 328. DC. Prod. ii. 249.—Legumen constanter sessile vidi. Stamen vexillare basi et apice liberum, medio in tubum integrum cum cæteris coalitum. Stylus lateraliter barbatus. Stigma vix brevissime penicillatum.—Dry Savannahs on the Rupunoony, where it is called Yarro conalli, and usedfor poisoning the fish Yarro, which will not eat the Hiarry. Schomburgk, n. 173.—Panama. Cuming, n. 1170. St. Vincent's, Anderson.

90. *Tephrosia* (Brissonia) *penicillata,* caule herbaceo decumbente rufo-pubescente, foliolis 5—9 oblongis obtusis mucrone recurvo adpresse pubescentibus, racemis elongatis oppositifoliis, calycis villosi dentibus e basi latiuscula subulatis tubo suo vix æquilongis, vexillo villoso, stylo glabro, stigmate longe penicillato, legumine rufo-villosulo.—Habitu *T. hispidulæ* ap-

proximatur. Stipulæ lineari-subulatæ. Stipellæ nullæ. Foliola pollicaria, alterna v. opposita, terminali latiore et longiore. Racemus semipedalis v. longior. Flores secus rhachin fasciculati, fasciculis 2—3-floris remotis. Pedicelli inferiores calyce sublongiores, superiores breviores. Bracteæ subulatæ. Bracteolæ nullæ. Corollæ calycem ter superantes, roseæ. Vexillum intensius coloratum, orbiculatum, emarginatum, longe unguiculatum, basi exappendiculatum. Alæ vexillo æquilongæ, transversim plicatæ. Carina parum brevior, vix unguiculata, petalis a basi dorso connatis. Stamina *T. toxicariæ*. Ovarium sessile, villosum. Stylus subcorneus glaberrimus. Stigma terminale.—Near the brook Akalaurie, on the Upper Rupunoony. Schomburgk, n. 678.

A larger Brazilian species, closely allied to the preceding, was gathered by Dr. Pohl in the desert pastures of S. Isabel, and has also been sent to me by the Academy of Petersburgh, gathered in the dry pastures of the Minas Geraes. It may be thus distinguished :

T. adunca, caule herbaceo ? decumbente rufo-pubescente, foliolis 7—13 oblongis obtusis adpresse pubescentibus mucrone recurvo, racemis elongatis oppositifoliis, calycis villosi dentibus e basi latiuscula subulatis tubo longioribus, vexillo villoso, stylo glabro, stigmate longe penicillato, legumine rufo-villosulo.—Corolla paullo minor, calyx major dentibus multo longioribus quam in *T. penicillata*.

91. *Tephrosia* (Brissonia ?) *brevipes*, suffruticosa ?, ramis erectis dense rufo-velutinis, foliolis 1—3 brevissime petiolatis anguste oblongis supra glabris subtus argenteo-sericeis, pedicellis axillaribus 1—3 brevissimis unifloris, calycis velutini dentibus tubo longioribus infima duplo longiore, vexillo alisque extus adpresse villosis, legumine rufo-velutino.—Foliola 1½—2 pollicaria, intermedio longiore, supra lineata, siccitate nigricantia. Stipulæ parvæ ; stipellæ subnullæ. Calycis dens inferior 3 lin. longus, incurvus, corollam subæquans. Petala cœrulea (teste Schomb.), uti filamenta maculis oblongis siccitate nigris crebris notata. Alæ oblongæ, vexillo et carina parum breviores. Stamina medio monadelpha, filamento vexillari basi et apice libero. Ovarium sessile villosum. Stylus glaber. Stigma pilis longis penicillatum. Legumen fere bipollicare.—Savannahs about Anna-y. Schomburgk, n. 66.

92. *Lonchocarpus ? floribundus*, foliolis 7 ovatis acuminatis coriaceis supra glabris subtus tenuissime sericeis, racemis folio duplo longioribus nodosis, floribus fasciculatis, calycibus vexilloque sericeis.—Foliola 2—3-pollicaria. Racemi pedales. Flores fere *L. sericei*, paullo minores, petalis tenuioribus. Calyx evidenter dentatus. Corolla lilacina (teste Schomb.). Stamina monadelpha. Ovarium sessile, villosum, 4-ovulatum. Stylus glaber. Legumen ignotum.—British Guiana. Schomburgk, n. 238.

93. *Lonchocarpus ? rufescens*, foliolis 9 oblongo-ellipticis acuminatis supra glabris subtus rufo-sericeis, racemis folio longioribus nodosis caule petiolisque rufo-tomentosis, floribus fasciculatis, calycibus rufo-pubescentibus, vexillo leviter sericeo.—Frutex. Foliola 3—5-pollicaria. Racemus 1—1½-pedalis. Flores *L. floribundi*, at glabriores. Legumen ignotum.—British Guiana. Schomburgk, n. 745.

94. *Lonchocarpus ?*

94. *Lonchocarpus? densiflorus*, scandens, foliolis 7—9 oblongo-ellipticis acuminatis supra glabris subtus pallidis tenuissime sericeis, petiolis cauleque glabriusculis, racemis ferrugineis folia subæquantibus nodosis, floribus fasciculatis, calyce pubescente, vexillo leviter sericeo.—Foliola 1½—2-pollicaria. Racemi vix semipedales, densi. Calyx obsolete dentatus. Carina valde incurva acuta. Stamina et ovarium præcedentium.—Banks of the Upper Essequibo, where the pounded stem is used for poisoning fish under the name of Bastard Hiarry. Schomburgk, n. 52.

The genus *Lonchocarpus*, though numerous in species, and some of them common in tropical America, is as yet so imperfectly known that it is not easy to trace its immediate affinities. It appears to connect the *Galegeæ* with the *Dalbergieæ*. The flowers are very nearly those of *Tephrosia* and *Robinia*, in which latter genus the early writers comprehended many of the species, but the pod is said, in most cases where it is known, to be indehiscent. If this be really the case it should probably be removed to *Dalbergieæ*. Among the supposed species of *Lonchocarpus* the *L. Amerimnum* seems to be a *Platymiscium*, and Kunth's genus *Clyciridia* should perhaps be adopted for the *L. sepium*. The *L. violaceus* and *L. punctatus* are remarkable from the mixture of round and oblong glandular dots in their leaves, and form a separate section if not a genus. The three new species enumerated above differ from most others by their inflorescence, which is that of many *Phaseoleæ*, but the flowers are precisely those of *Lonchocarpus*, and in the absence of the fruit it does not appear advisable to separate them.

Tribe Hedysareæ, *DC.*

95. *Æschynomene sensitiva*, Linn. DC. Prod. ii. p. 320.—British Guiana. Schomburgk, n. 603.—French Guiana. Herb. Par. n. 45.

96. *Æschynomene paniculata*, Willd. Vogel, Linnæa, xii. p. 95.—British Guiana. Schomburgk, n. 181.

97. *Æschynomene* (Ochopodium) *conferta*, ramis pubescentibus foliosis, foliolis 8—12-jugis parvis confertis oblongis utrinque adpresse et sparse pilosis, racemis folio brevioribus subsex-floris flavo-hirtis, leguminibus profundissime partitis biarticulatis pilosis.—Herba bipedalis sequentibus affinis.—British Guiana. Schomburgk, n. 187.

98. *Æschynomene hystrix*, Poir. Dict. Suppl. iv. p. 77. DC. Prod. ii. p. 321.—French Guiana. Herb. Par. n. 27.

99. *Æschynomene paucijuga*, DC. l. c.—French Guiana. Herb. Par. n. 10.

100. *Zornia reticulata*, Sm. DC. Prod. ii. p. 316.—Arid Savannahs of the south chain of the Conocon Mountains, British Guiana. Schomburgk.

101. *Zornia latifolia*, DC. Prod. ii. p. 317.—British Guiana. Schomburgk, n. 257.

102. *Stylosanthes gracilis*, Humb. et Kunth, Nov. Gen. et Sp. vi. p. 567

—507. DC. Prod. ii. 318.—Dry Savannahs, British Guiana. Schomburgk, n. 240.

103. *Stylosanthes guianensis*, Swartz. DC. Prod. ii. p. 318.—French Guiana. Leprieur, Herb. Par. n. 20.

104. *Stylosanthes viscosa*, Swartz. DC. Prod. ii. p. 317—Savannahs, British Guiana. Schomburgk, n. 178 or 278.

105. *Stylosanthes angustifolia*, Vogel, Linnæa, xii. p. 63.—Spicæ tenues, sæpe ultrapollicares, basi subinterruptæ. Flores inferiores 4—8 fœminei, incompleti, stylo multo longiore quam in cæteris speciebus, superiores pauci completi steriles.—French Guiana. Herb. Par. n. 18.

106. *Nicholsonia cayennensis*, DC. Prod. ii. p. 325.—British Guiana. Schomburgk, n. 19.—French Guiana. Leprieur, Herb. Par. n. 15. This and the *N. venustula* are probably mere varieties of *N. barbata*.

107. *Desmodium pachyrrhizum*, Vogel, Linnæa, xii. p. 97.—British Guiana. Schomburgk, n. 657. The specimens agree both with Vogel's description and with others gathered by Pohl in Brazil.

108. *Desmodium elatum*, Humb. et Kunth, Nov. Gen. et Sp. vi. p. 527. DC. Prod. ii. p. 328.—British Guiana. Schomburgk. Gardner's n. 971. from Pernambuco appears to be the same species though less hairy.

109. *Desmodium asperum*, Desv. DC. Prod. ii. p. 333. Folia nonnunquam, præsertim inferiora, unifoliolata.—French Guiana. Leprieur.

110. *Desmodium rubiginosum*, caule herbaceo obtuse tetragono erecto petiolisque rufo-villosis, stipulis basi dilatatis stipellisque striatis longe acuminatis, foliolis 3 ovatis obtusis mucronatis crassis utrinque tomentoso-villosis rufescentibus, racemis paniculatis terminalibus, floribus parvis numerosis, leguminibus moniliformibus pluriarticulatis hispidulis. Affine *D. aspero*, at satis distincta videtur. Foliola minora, mollius et densius villosa.—British Guiana. Schomburgk, n. 217.

111. *Desmodium ancistrocarpum*, DC. Prod. ii. p. 331. Species a *D. incano* parum diversa.—French Guiana, Leprieur; and in various Brazilian collections.

112. *Desmodium cajanæfolium*, DC. Prod. ii. p. 331.—Hedysarum cajanæfolium, *Humb. et Kunth, Nov. Gen. et Sp.* vi. p. 525. t. 598. var.? foliis supra pilis minutis sparse hirtellis—British Guiana. Schomburgk, n. 648.

Tribe Phaseoleæ, *DC.*

113. *Clitoria Poitæi*, DC. Prod. ii. p. 234.—British Guiana. Schomburgk. Panama or Western Columbia. Cuming, n. 1141.

In this species the bracteolæ are much shorter than the calyx, yet, on account of its habit, it must be referred to the section *Bractearia*, which would remain characterized by the frutescent stem and trifoliolate leaves only. I am informed also that the name *Bractearia* has been given to a genus of *Rubiaceæ* and to a section of *Chætogastra*, and although it does not seem strictly necessary that the same *sectional* name be not used in different genera, yet as *Bractearia*

is now moreover inappropriate, it may be changed to *Dendrocyamus*.

To the same section belongs the following new species of *Clitoria* from the Petersburgh herbarium.

C. mucronulata, caule fruticoso glabro, ramis junioribus petiolis racemisque minute puberulis, foliolis oblongo-ellipticis vix acuminatis glabris vel subtus margineque sparse puberulis, racemis paucifloris folio brevioribus, bracteolis ovali-oblongis calycem subæquantibus.—Ad Rio Madeira et Borba in Brasilia.—Stipellæ petiolulo breviores. Foliola omnia mucronulata. Vexillum leviter adpresse pubescens. Legumen junius villosum.

114. *Neurocarpum longifolium*, Mart. in Benth. Ann. Mus. Vind. ii. p. 116. var. longifolium. *N. frigidulum*, ejusd. l. c.—British Guiana. Schomburgk.

Since I described the above two plants I have seen intermediate specimens which convince me that they are but varieties of each other. The species has an extensive range from the Essequibo to the province of Minas Geraes in Brazil.

115. *Neurocarpum cajanæfolium*, Presl. Symb. Bot. p. 17. t. 9.—Savannahs at Anna-y. Schomburgk, n. 58. It appears to be a common plant from the Spanish Main to Rio Janeiro. It is Gardner's n. 960. from Pernambuco.

The *N. guianense*, DC., or *Crotalaria guianensis* of Aublet, was by mistake omitted in my memoir above-quoted. I have not seen it, but from the figure and descriptions it appears to be near the two preceding ones, but different from both.

116. *Centrosema vexillatum*, caule herbaceo glabro, ramulis junioribus pedunculisque puberulis, foliolis oblongo-ellipticis ovalibusve obtusis, pedunculis petiolo longioribus apice racemosis paucifloris, bracteolis ovalibus amplis calyce triplo longioribus extus puberulis, calycis dentibus superioribus brevissimis.—British Guiana. Schomburgk, n. 373.—Foliola 2—4-pollicaria. Stipellæ setaceæ. Bracteolæ 10 lin. longæ. Vexillum sesqui-pollicare, latissimum.

117. *Centrosema brasilianum*, Benth. in Ann. Mus. Vind. ii. p. 118.—British Guiana. Schomburgk, n. 239.

Allied to the above, but differing in inflorescence and form of leaves, is the following from Sumadoris in Brazil, received from the Academy of Petersburgh.

C. brachypodum, ramis petiolisque pubescentibus, foliolis ovatis acuminatis, basi subcordatis rotundatisve supra glabris subtus ad venas puberulis, pedunculis brevissimis apice dense multifloris, bracteolis ovatis obliquis acuminatis calyce longioribus, dentibus calycinis superioribus brevissimis.

The *C. angustifolium* was gathered by Salzmann at Bahia, and is in the Herbarium of the Academy of St. Petersburgh from Tejuco;

the same collection contains also a remarkable variety of *C. arenarium* with almost emarginate leaflets.

Allied to *C. arenarium*, but belonging to the second division of the genus, is the following species gathered by Salzmann at Bahia.

C. Salzmanni, caule glabro, ramulis pedunculisque pubescentibus, foliolis oblongo-ovatis acuminatis vix coriaceis supra glabris subtus ad venas puberulis demum glabris, pedunculis petiolo brevioribus vel vix longioribus apice umbellato-plurifloris, bracteolis ovatis obliquis acuminatis calycis dente inferiore brevioribus, calycibus puberulis quadrifidis, dentibus superioribus latis tubo æquilongis, supremo bidentato, infimo longissimo lineari.

Blanchet's n. 2705. from the Serra Jacobina in the province of Bahia is a curious little species, allied to *C. rotundifolium*, but with five to seven smaller and narrower leaflets. My specimen however is not good enough to establish the diagnosis satisfactorily.

118. *Centrosema macrocarpum*, caule juniore petiolisque pilosis demum glabrato, foliolis ovatis breviter acuminatis vix coriaceis supra vel utrinque glabris, pedunculis petiolum subæquantibus apice dense plurifloris, bracteolis dentibus calycinis subbrevioribus, calycibus latissimis 4-fidis, laciniis tubo longioribus divaricatis, suprema bidentata, inferioribus approximatis.—British Guiana. Schomburgk.

This species differs chiefly from *C. grandiflorum* by its thinner leaves perfectly glabrous, or with only a few hairs along the midrib. Its beans, according to Schomburgk, are eaten by the Indians, under the name of *Commawissi*. He adds, that the pods are uncommonly large; in the single specimen sent by him the young ones are already nine inches long.

Gardner's n. 173. from Rio Janeiro is *Centrosema decumbens*, Mart.; his n. 356. from the Organ Mountains is a new species belonging to the same division and may be thus characterized:—

C. dasyanthum, caule glabro vel ramulis petiolisque junioribus puberulis, foliolis ovali-oblongis acuminatis vix coriaceis utrinque glabris, pedunculis brevibus apice paucifloris, bracteolis dentibus calycinis brevioribus rufo-villosis, calycibus 4-fidis laciniis lato-lanceolatis tubo sublongioribus rufo-villosis supremo bifido, vexillo extus rufo-villosissimo.

Blanchet's n. 2721. from the Serra Jacobina is a slight variety of *Periandra dulcis*, Mart., and his No. 2555. from the same chain is *P. coccinea*, Benth.

119. *Stenolobium cæruleum*, Benth. in Ann. Mus. Vind. ii. p. 125.—British Guiana, Schomburgk, n. 218.

This is a widely diffused and apparently common plant; besides the numerous specimens gathered by Pohl, Martius, Salzmann, and others in various parts of Brazil, it is found in the Isle of St. Vin-

cent's and in Central America. It is Cuming's n. 1097. from Panama.

The name of *Stenolobium* had been given by Don to a genus of *Bignoniaceæ*, and I have therefore in some herbaria given the name of *Cyanostremma* to my genus; but as it now appears that Don's *Stenolobium* is not adopted, mine may retain that name. The following gathered by Salzmann at Bahia is a fourth species:—

S. velutinum, foliolis concoloribus, calycibus querufo-velutinis, leguminibus piloso-hispidis.—Calyces 4 lin. longi, tubuloso-campanulati. Corolla intense colorata, 8 lin. longa.

120. *Galactia velutina*, volubilis, mollissime villosa, foliolis 3 ovalibus obtusis basi subcordatis supra velutino subtus subsericeo-villosis, pedunculis brevissimis paucifloris, laciniis calycinis tubo subtriplo longioribus corolla parum brevioribus.—British Guiana. Schomburgk, n. 649.

A somewhat coarse species with larger leaves than most of the American species. They somewhat resemble in form those of *G. canescens* (Texas, Drummond, 2nd Coll. n. 81. 3rd Coll. n. 146.), but the species is readily known by the soft down of the whole plant.

Cologania heterophylla of Gillies, judging from Tweedie's specimens, is a *Galactia* very near to, if not identical with, *G. marginalis*, which is Drummond's n. 145 of his third Texas collection.

121. *Collæa rosea*, caule suffruticoso erecto? tomentoso-villoso, foliolis 3 ovali-ellipticis utrinque obtusis submucronatis coriaceis supra pubescentibus subtus molliter villosis, pedunculis folio subbrevioribus interrupte racemosis, calycis villosi laciniis lanceolatis tubo parum longioribus, vexillo glabro, leguminibus cano-velutinis.—British Guiana. Schomburgk, n. 261.

Near *C. Neesii* and *C. Martii*. Flowers much smaller than in the former and racemes much shorter. I do not possess specimens of *C. Martii*, but the present plant does not agree with the descriptions of it.

122. *Dioclea lasiocarpa*, Mart. Benth. in Ann. Mus. Vind. ii. p. 133.—French Guiana. Herb. Par. n. 39 and 48. It is also Gardner's n. 970 from Pernambuco, and perhaps *Dolichos comosus* of Meyen's Essequibo Flora.

123. *Dioclea guianensis*, Benth. l. c. p. 134.—British Guiana. Schomburgk, n. 83.—β. villosior, foliolis supra pubescentibus, subtus dense sericeis, venis petiolisque rufescentibus.—British Guiana. Schomburgk, n. 629.

Gardner's n. 353 from the Organ Mountains is *Cleobulia multiflora*, Mart., his n. 355 from the same chain is *Canavalia picta*, Mart., var. *longiracemosa*. Cuming's n. 1204 from Panama is a slight variety of *Canavalia obtusifolia*, DC. Blanchet's n. 2748 from Utinga in the province of Bahia is *Canavalia brasiliensis*, Mart., which species is also in Salzmann's Bahia collection.

124. A single imperfect specimen of a very fine *Phaseolea* allied to *Canavalia*, and in some respects to *Vexillaria*, probably forming a new genus, but which with the present materials I am unable to characterize.

125. *Phaseolus lasiocarpus*, Mart. in Benth. Ann. Mus. Vind. ii. p. 140. —British Guiana. Schomburgk.

126. *Phaseolus longipedunculatus*, Mart. in Benth. Ann. Mus. Vind. ii. p. 141. var. inter α et β fere media, foliolis fere omnibus integris.—French Guiana. Leprieur, Herb. Par. n. 46 and 49.

127. *Phaseolus linearis*, Humb. et Kunth, Nov. Gen. et Sp. vi. p. 445? —Arid Savannahs at the foot of the Conocon Mountains. Schomburgk.

128. *Phaseolus gracilis*, Pöpp. in Benth. l. c.?—Arid Savannahs about Anna-y. Schomburgk. The single specimens sent by Schomburgk of these three *Phaseoli* are so imperfect that I am unable to determine them with certainty.

129. *Eriosema lanceolatum*, caulibus basi procumbentibus appresse pilosis apice ascendentibus rufo-barbatis, stipulis in unum lanceolatum oppositifolium connatis, petiolis brevissimis, foliolo unico late lanceolato obtuso mucronato basi subcordato supra glabro subtus ad venas appresse ferrugineo, racemis brevibus paucifloris.—British Guiana. Schomburgk, n. 651.—French Guiana. Herb. Par. n. 16. Flowers yellow (Schomburgk.).

130. *Eriosema violaceum*. Rhynchosia (*Eriosema*) violacea, *DC. Prod.* ii. p. 388. Cytisus violaceus, *Aubl. Fl. Guian.* ii. p. 766. t. 306.—British Guiana. Schomburgk, n. 642.

131. *Eriosema crinitum*. Rhynchosia (*Eriosema*) crinita, *DC. Prod.* ii. p. 389. Glycine crinita, *Humb. et Kunth, Nov. Gen. et Sp.* vi. p. 421. t. 573.

132. *Eriosema pulchellum*, Rhynchosia (*Eriosema*) pulchella, *DC. l. c.* Glycine pulchella, *Humb. et Kunth, l. c.* p. 422.

The two last species were sent together by Schomburgk and numbered in my set 245, but from his list there is reason to think there is some mistake of label. I am not certain of having referred the last one rightly to Kunth's species, although it agrees tolerably well with his description.

[To be continued.]

XLIX.—*On the Metamorphoses of the* Crustacea. By Capt. C. DuCane, R.N.

[With a Plate.]

Having since my last communication to the Rev. L. Jenyns on the subject of the metamorphoses of the Crustacea, published in the Ninth Number of the 'Annals of Natural History,' had an opportunity of making some observations on the larva of a small species of the common crab (*Carcinus Mœnas*),

I beg to trouble you with the following particulars and accompanying drawings of this animal, which I believe has not hitherto been figured, and is otherwise interesting, as confirmatory of the fact of some species of the *Brachyurous*, as well as the *Macrourous Decapods*, being subject to a succession of changes before they reach their adult state.

The crabs from which this larva was obtained were brought to me carrying their ova under their abdomen as early as the latter end of December last, but it was the beginning of March before one of them began to produce its larvæ, and even then, and indeed during the whole of the month of March and great part of April, comparatively few of the ova were hatched. The form of the larva up to this period is shown in fig. 1.; it exhibited no other symptoms of life than merely slight movements of the limbs and antennæ, and although fully developed, was from this circumstance, and the extreme transparency of its different organs, exceedingly difficult to delineate. Towards the end of April however, after the crabs had been carrying their ova for a period of four months, I had the satisfaction to find the larvæ alive in great abundance, a large mass lying at the bottom of the vessel in which the crabs were kept, still of the same form I had found them previously, but vast numbers of others swimming about the surface of the water of the form shown in Plate XI. fig. 2.

I was much surprised at thus finding myself suddenly in possession of apparently two different animals; but the fact is, as I soon discovered, the larva is scarcely excluded from the egg of the form Pl. XI. fig. 1., before it casts off this envelope, and assumes the appearance represented by Pl. XI. fig. 2.; indeed the animal, as it appears in this latter state, is distinctly visible through the delicate and highly transparent envelope which incloses it in its first condition, as I have endeavoured to show both in fig. 1. and in the equally highly magnified sketches of the tails, figs. 5 and 6.

As the ova continued to be hatched in great abundance during many successive days, I had repeated opportunities of observing this change effected; it is accomplished as follows:— On its first liberation from the egg, the larva lies on its side, and seems to be only capable of progressing through the water

by contracting and again expanding the abdominal section of its body. These movements soon detach its large tail, and with it the whole abdominal envelope; after which the animal uses the most violent exertions, by means of the now strong spines of its tail, doubling it under its thorax, and throwing it back straight again, with all the force it is capable of, to tear away the covering of the legs. The great majority of the larvæ exhaust themselves and fall victims to their fruitless efforts to accomplish this portion of the moult; but having effected it, the antennæ and corselet come away also; the dorsal spine, which is seen in fig. 1. reclining towards the head, rises up and takes an inclination in the opposite direction; the frontal spine, which has hitherto been doubled up and concealed under the thorax, unfolds itself; and the little animal swims away with an awkward short movement of its natatory legs, sometimes on its back as represented in fig. 3, sometimes on its face as in fig. 4; but always with its tail bent under it, approximating to the situation it is destined to be carried in when the animal has attained its adult state.

The larva of *Carcinus Mœnas*, it will be observed, in its second stage resembles in its general character that of *Cancer Pagurus*, figured by Mr. Thompson in the Second Number of his Zoological Researches. They are both as unlike their original types as it is well possible to imagine, and the probability I think is that they have each still to undergo a succession of changes before they become perfect crabs. Having obtained the larvæ of *Carcinus Mœnas* from two different specimens in such abundance, I entertained great hopes of following it through all its phases; none of the larvæ, however, survived their birth beyond the fourteenth day, at which time they showed no indications of any preparation for a further metamorphosis.

Southampton, May 29, 1839.

L.—*Remarks on the* Fumariaceæ. By George Dickie, Esq., A.L.S., Lecturer on Botany at Aberdeen.

The characters of the order *Fumariaceæ* are generally stated thus: "Sepals two, deciduous. Petals four, cruciate, par-

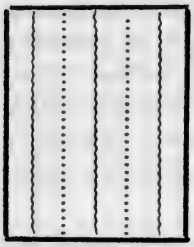
allel, the two outer either one or both saccate at the base, the two inner callous and coloured at the apex, where they cohere and inclose the anthers and stigma. Stamens six, in two parcels, opposite the outer petals, very seldom all separate. Anthers membranous, the two outer of each parcel one-celled, the middle one two-celled," &c.

Lindley, in his 'Introduction to the Natural System', considers the parts as divided upon a binary plan; the bodies commonly called deciduous sepals he considers as bracts, the outer series of the supposed petals he considers as a calyx, and the inner only as petals. He also considers the lateral one-celled anther of each parcel as belonging to a common stamen, the filament of which is split by the separation of the two parcels. This opinion might appear at first sight forced, in order that the parts may conform to the arrangement in a normal flower; if however the structure of the parts be examined it will be seen that this opinion is exceedingly plausible.

Each common filament is traversed by three distinct fasciculi of vessels; the central one, which passes to the two-celled anther, is double the size of those which pass to the lateral anthers; their relative position must also be attended to. They are placed at equal distances from each other, but *the two lateral ones are very near the margin of the filament.* In all perfect stamens of different plants which I have examined there has been seen only one bundle of vessels, which passed straight through the centre of the filament to the anther.

If the arrangement in *Fumaria* is normal, it is then a remarkable exception to the usual method. It appears much more probable that the filament is compound, and composed of one entire filament and portions of two others. In some specimens of *Fumaria* the adhesion of the lateral portions is very slight, and they may be readily separated from that in the centre with very little force; and in very young flower-buds there is no adhesion, the single-celled anthers are quite separate, and the apices of the inner petals as they are commonly called are also free. It has been already mentioned that the fasciculi of vessels passing to the single-celled anthers are very near the margin of the common filaments: now in some of those cases where a partial adhesion only is found, these ves-

sels are nearer the outer than the inner edge of the filament bearing the one-celled anther. The figure will illustrate this: the waved lines represent the vessels, and the dotted lines the places where the compound filament has a tendency to separate. This is another fact which adds much to support the probability of Prof. Lindley's opinion.



Should it however be denied that the venation of the parts cannot in this case enable us to explain the anomaly, whether apparent or real, it will be allowed that the arrangement of the vessels, which appears in a great number of instances to be very regular and constant, is worthy of attention. This has been applied in explaining the arrangement of the parts of the flower in the *Gramineæ*; and the venation of the ligulate corolla of the *Compositæ* appears to indicate the true nature of this peculiar form of perianth.

Occasionally monstrosities occur in plants which are otherwise very regular in the arrangement of their flower; adhesion of parts which are generally separate frequently occurs. A monstrous variety of *Lycopsis arvensis* occurred to me some time back, in which the corolla was 12-cleft, the stamens 11, the ovules upwards of 20 in number, with 3 styles: the calyx contained 11 divisions.

The three styles were very unequal in size, two small and one very large; the latter contained four distinct fasciculi of vessels. One of the smaller styles presented near its summit a small curved process supplied by a separate bundle of vessels; this process when dissected presented the structure of an anther: it contained an imperfect pollen, and its lining membrane consisted of the same peculiar fibro-cellular tissue which is found in the anther in its natural condition. Occasionally two stamens adhere by their filaments in *Mercurialis perennis*, presenting the remarkable appearance of a four-celled anther. In such cases however the filament contains two distinct sets of vessels of equal size, which shows the true nature of the anomaly; and if any other proof was necessary, specimens occur which present various degrees of adhesion between neighbouring filaments, from the slightest possible to that which

has been alluded to. Prof. Henslow, in 'Mag. of Zool. and Bot.' (vol. i. p. 259), has admirably illustrated the arrangement of the stamens in *Adoxa moschatellina*, in which we generally find a separation of these into two parts; the anthers consequently appear to be one-celled: but examples occur in which there is no separation, the stamens being perfect, and others in which the separation is the slightest possible, and so on through different degrees to total separation.

Many other examples of adhesion or of separation might be mentioned, but such must be familiar to every one who dissects plants: may it not be inferred that in *Fumaria* another example is presented?

BIBLIOGRAPHICAL NOTICES.

A General Outline of the Animal Kingdom. By Thomas Rymer Jones, F.Z.S., Prof. Comparative Anatomy in King's College. Parts I.—VI. London, Van Voorst.

The present work, forming part of the series published by the above firm, among which we find the beautiful works of Yarrell, Bell, &c., has for its object a general view of the animal creation, exhibiting the structure and internal œconomy of every class of living beings, and developing with as much simplicity as possible the principles of zoological arrangement as based upon animal organization. This difficult task, which must necessarily be to a certain extent a compilation, requiring therefore a profound knowledge of the subject and large acquaintance with the writings of foreign authors, could not have fallen into better hands. In the present state of the science it is no easy matter to keep pace with what is doing on the Continent; many works which appear there are known but by few persons in this country, and to this circumstance we must attribute the occurrence of some slight mistakes in this work. Mr. Jones also appears in part to have derived his knowledge of the researches of the Germans from French sources, which are apt to mislead. With regard to the class Bryozoa, we could have wished that the labours of S. L. Lovèn had been consulted, which were published in the Transactions of the Swedish Academy for 1835, and translated in Wiegmann's Archiv for 1837, p. 249. Prof. Jones's views respecting the internal organization of Infusoria, as well as those of Meyen and Dujardin, have been given in this Journal, as also Ehrenberg's answer to the objections; so that it is unnecessary for us to enter

more at length into this subject. We may however observe that none of the opposers of Ehrenberg's views agree in what they see; we are therefore still inclined to place confidence in his observations, trusting that this important subject will soon be thoroughly investigated. Speaking of the superiority of modern microscopes, Prof. Jones observes, that a few years ago some Infusoria, now distinctly proved to be covered with cilia, were looked upon as being absolutely destitute of locomotive organs, for instance, *Volvox globator*; we would however remind the author, that if a great deal depends on the goodness of the instrument, a vast deal more depends on the long practice and manipulation of the observer; and no better proof of this fact can be adduced than that this Infusorium, usually considered as a simple animal, even in the present work, is a conglomeration of several hundred individuals. We have inserted the paragraph respecting this remarkable animalcule from Ehrenberg's large work on Infusoria among the miscellaneous articles of the present number. *Trichina spiralis*, hitherto found only in the human body, has been discovered by Dr. Siebold in several animals and birds, and even in *Scarabæus stercorarius**. Mr. Jones is also led into error with respect to the occurrence of the eggs of *Cristatella* in a fossil state by Turpin's mangled description of the fossil specimens of *Xanthidium*, discovered by Ehrenberg in the Feuerstein of Delitzsch, and forwarded by him to the French Academy. The *Xanthidium* is a decided Infusorium, and Ehrenberg, in a paper respecting this misstatement of Turpin, which has however probably escaped the attention of Prof. Jones, clearly proves that it is no egg, and moreover several fossil species of *Xanthidium* occur in the recent state which had been figured previous to their discovery in flint. Besides, whoever has examined the egg of *Cristatella* and also living *Xanthidia* will be convinced of their distinctness. Those who have not may compare the beautiful drawings of the various *Xanthidia* occurring in the flints of the chalk, illustrating the Rev. B. Reade's paper at p. 191 of the 2nd volume of the 'Annals', with the excellent copy of Turpin's drawing of *Cristatella Mucedo*. Dr. Farre's beautiful discoveries have been consulted with respect to the Ciliobrachiate Polyps, Milne Edwards for the Flustræ, and Strauss Durchheim, Dugès, and J. Müller for the insect tribe. We are convinced that no work will have tended more to diffuse a love for zoological science and comparative anatomy in this country than that before us, and we feel called upon to express most decidedly our sense of the obligations which its learned author has conferred upon the English public by placing be-

* Wiegmann's Archiv, part IV. for 1838, p. 312.

fore the lovers of natural history so large and valuable a collection of materials.

Too much praise cannot be awarded to the wood engraver, as we have never seen more perfect or beautiful specimens of this art than many of the illustrations of the present work. It is intended to be completed in ten or twelve parts, of which the seventh may be early expected.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

October 23, 1838.—William Yarrell, Esq., in the Chair.

A letter was read from M. Julien Desjardins, Secretary of the Natural History Society of the Mauritius, stating that it was his intention to leave that island on the 1st of January next, for England, with a large collection of objects in natural history, many of which he intended for the Society. A letter from Colonel P. Campbell, Her Majesty's Consul General and Agent at Alexandria, was also read. In this letter Col. P. Campbell states that he had not yet succeeded in gaining any further information respecting the probability of procuring some White Elephants for the menagerie. A letter received from Lieut.-Colonel Doherty, Governor of Sierra Leone, stated, that he was using every exertion to procure for the Society a male and female Chimpanzee, in which attempt he fully expected to be successful; but he feared that he should not be able to obtain a living specimen of the Hippopotamus, from the superstitious dread with which the natives regard these animals.

Some specimens of Flying Lemurs (*Galeopithecus*) were upon the table, and in reference to them Mr. Waterhouse stated that his object in bringing them before the Meeting was to notice certain characters which appeared to him to indicate the existence of two species in these specimens. He remarked that in systematic works three species of the genus *Galeopithecus* are described, founded upon differences of size and colour; as regards the latter character, he had never seen two specimens which precisely agreed; and with respect to size, the dimensions given of two out of the three species are evidently taken from extremely young animals. Mr. Waterhouse then proceeded to point out the distinctive characters of the two species on the table, for which he proposed the specific names of *Temminckii* and *Phillippinensis*; of these two the first is the larger species, measuring about two feet in total length, and having a skull two inches

eleven and a half lines in length. The anterior incisor of the upper jaw is broad and divided by two notches into three distinct lobes; the next incisor on each side has its anterior and posterior margins notched; and the first molar (or the tooth which occupies the situation of the canine) has its posterior edge distinctly notched. This tooth is separated by a narrow space anteriorly and posteriorly, from the second incisor in front, and the second molar behind; the temporal ridges converge towards the *occiput*, near which, however, they are separated usually by a space of about four lines.

The second species (*G. Philippinensis*) is usually about twenty inches in length, and has a skull two inches seven lines in length. It may be distinguished from *G. Temminckii* by the proportionately larger ears, and the greater length of the hands; the skull is narrower in proportion to its length; the muzzle is broader and more obtuse; the orbit is smaller; the temporal ridges generally meet near the *occiput*, or are separated by a very narrow space; the anterior incisor of the upper jaw is narrow, and has but one notch; the next incisor on each side is considerably larger, longer, and stronger than in *G. Temminckii*, and moreover differs in having its edges even; the same remarks apply to the first false molar. The incisors and molars here form a continuous series, each tooth being in contact with that which precedes, and that which is behind it. The most important difference perhaps which exists between the two species in question consists in the much larger size of the molar teeth in the smaller skull, the five posterior molars occupying a space of ten lines in length, whereas in *G. Temminckii*, a much larger animal, the same teeth occupy only nine lines. The above are the most prominent characteristic differences in the two species, though several other minor points of distinction may be observed.

Mr. Blythe called the attention of the Meeting to the skull of a Cumberland Ox, presenting an unnatural enlargement of the facial bones, accompanied with a most remarkable development of the horns, one of which measured four feet in circumference at its base.

The reading of Professor Owen's paper "On the Osteology of the Marsupialia," was completed. After some preliminary remarks upon the importance of the study of the skeleton, in investigating the natural groups of this order and the determination of the interesting fossils of Australia, Professor Owen proceeded in the first place to point out the principal modifications in the general form of the skull as observed in the various genera of marsupial animals.

"The skull," says Professor Owen, "is remarkable in all the genera for the small proportion which is devoted to the protection

of the brain, and for the great expansion of the nasal cavity immediately anterior to the cranial cavity.

"In the stronger carnivorous species the exterior of the *cranium* is characterized by bony ridges and muscular impressions; but in the smaller herbivorous species, as the Petaurists and Potoroos, the *cranium* presents a smooth rounded surface as in birds, corresponding with the smooth unconvoluted surface of the simple brain contained within.

"The breadth of the skull in relation to its length is greatest in the Wombat and Ursine Dasyure in which it equals three-fourths the length, and least in the *Perameles lagotis* in which it is less than one-half. The occipital region, which is generally plane and vertical in position, forms a right angle with the upper surface of the skull, from which it is separated by an occipital or lambdoidal *crista*. This is least developed in the Myrmecobius, Petaurists, and Kangaroo, and most so in the Opossum, in which, as also in the Koala, the crest curves slightly backwards, and thus changes the occipital plane into a concavity, well adapted for the insertion of the strong muscles from the neck and back.

"The upper surface of the skull presents great diversity of character, which relates to the different development of the temporal muscles, and the varieties of dentition in the different genera. In the Wombat the coronal surface offers an almost flattened tract, bounded by two slightly elevated temporal ridges, which are upwards of an inch apart posteriorly, and slightly diverge as they extend forwards to the anterior part of the orbit.

"The skull of the Opossum presents the greatest contrast to that condition, for the sides of the *cranium* meet above at an acute angle, and send upwards from the line of their union a remarkably elevated sagittal crest, which, in mature skulls, is proportionally more developed than in any of the placental Carnivora, not even exempting the strong-jawed Hyæna.

Of the Composition of the Cranium.—"The occipital bone is developed, as in the placental Mammalia, from four centres or elements, the basilar below, the supra-occipital above, and the ex-occipitals at the sides; but these elements remain longer separate, and in some genera do not become, at any period of life, united by continuous ossification.

"In the skull of an aged Virginian Opossum I found the supra-occipital still distinct from the ex-occipitals, and these not joined together, though anchylosed to the basilar element: in this Marsupial animal they meet above the *foramen occipitale*, and complete

its boundaries, as the corresponding superior vertebral *laminæ* complete the medullary canal, in the region of the spine. I have found the same structure and condition of the occipital bone of an adult *Dasyurus Ursinus*, and it is exhibited in the plate of the *cranium* of this species given by M. Temminck*. In the skull of a *Perameles nasuta* the ex-occipitals were separated by an interspace, so that a fissure was continued from the upper part of the *foramen magnum* to the supra-occipital element. The same structure may be observed in the Kangaroo, and is very remarkable in the young skulls of this species; I found this superior notch wide and well-marked in *Macropus Bennettii*. In the Wombat the corresponding fissure is very wide, and the lower margin of the supra-occipital is notched, so that the shape of the *foramen magnum* somewhat resembles that of the trefoil leaf. In the Koala, the Phalanger, Petaurus, Hypsiprymnus, and *Dasyurus Maugei*, the elements of the occipital bone present the usual state of bony confluence.

"The temporal bone generally presents a permanent separation of the squamous, petrous, and tympanic elements. I have observed this reptile-like condition of the bone in the mature skulls of an Ursine Dasyure, a Virginian Opossum, a Perameles, in different species of Potoroo and Kangaroo, in the Wombat, and in the Koala. So loose, indeed, is the connection of the tympanic bone, that, without due care, it is very liable to be lost in preparing the skulls of the Marsupiata.

"In the Virginian Opossum the bony palate presents eight distinct perforations besides the incisive foramina; the palatal processes of the palatine bone extend as far forwards in the median line as the third molares; a long and narrow fissure extends for an equal distance (three lines) into the palatal processes, both of the palatines and maxillaries; behind these fissures, and nearer the median line, are two smaller oblong fissures; external, and a little posterior to these, are two similar fissures, situated in the palato-maxillary suture; lastly, there are two round perforations close to the posterior margin of the bony palate.

"Now there is no carnivorous quadruped in the placental series which has a bony palate characterized by perforations and vacuities of this kind. In the dog, the cat, and the weasel tribe, the bony palate is only perforated by two small oblique canals, which open in or near the palato-maxillary suture. The very great interest which is attached to the fossil jaws of the Stonesfield Marsupials, the only mammiferous remains hitherto discovered in the secondary formations,

* *Monographie de Mammalogie*, pl. viii.

will justify the minuteness, perhaps tediousness, with which I have dwelt on characters that, inclusive of the teeth, serve to distinguish the *cranium* of the Marsupial from that of any placental quadruped. The structure of the bony palate in the Marsupiata is interesting in other respects. Since the defective condition of this part of the *cranium* is one of the characteristics of the skull of the bird, it might be expected that some approximation would be made to that structure in the animals which form the transition between the placental and oviparous classes. We have already noticed the large vacuities which occur in the bony palate of nearly all the Marsupials, but this imperfectly ossified condition is most remarkable in the Acrobates and *Perameles lagotis*. In the latter the bony roof of the mouth is perforated by a wide oval space, extending from the second spurious molars to the penultimate molars, exposing to view the vomer and convolutions of the inferior spongy bones in the nasal cavity. Behind this space there are six small perforations; two in a transverse line, midway between the great vacancy and the posterior margin of the bony palate, and four in a transverse line, close to that margin.

"In the Ursine Dasyure a large transversely oblong aperture is situated at the posterior part of the palatal processes of the maxillary bones, and encroaches a little upon the palatines; this aperture is partly, perhaps in young skulls, wholly bisected by a narrow longitudinal osseous bridge. The large aperture in the skull of the *Dasyurus Ursinus*, figured by Temminck, is the result of accidental injury to the bony palate.

"The lower jaw of the marsupiata is a part of their osseous structure which claims more than ordinary attention, in consequence of the discussions to which the fossil specimens of this bone, discovered in the oolitic strata of Stonesfield, have given rise. I have examined the two specimens in the possession of Dr. Buckland, the specimen formerly in the collection of Mr. Broderip, and that which is preserved in the Museum at York; the composition of the lower jaw, each ramus of which consists of one piece of bone, the convex condyle, and the double fangs of the molar teeth, prove the mammiferous character of these remains; the size, elevation, and form of the coronoid process of the lower jaw, the production of the angle of the jaw, with the development of the canines, and the pointed tubercular crowns of the molar teeth, indicate the carnivorous and insectivorous character of the species in question. The number of the incisors, eight in the lower jaw, and the structure and proportions of the molar teeth, approximate these small *insectivora* most nearly to the smaller species of the modern genus *Didelphis*; but

the number of the molars in one of the specimens exceeds that of any insectivore, placental, or marsupial, which was known at the period when Cuvier wrote on this fossil. Recently, however, a genus of insectivorous mammal (*Myrmecobius*) has been discovered in Australia, presenting the modifications of the *cranium* which characterize the marsupiata, and having nine tuberculate molares in each ramus of the lower jaw.—(*See Mr. Waterhouse's Memoir, Zool. Trans.* ii. pl. 28. fig. 2, 5.) Besides the osteological characters above alluded to, there is a character in the lower jaw of the marsupial animals, not peculiar to the genus *Didelphis*, which serves to distinguish it from that of the placental mammalia. In the carnivorous marsupials, as the Thylacine, the lower maxillary bone very nearly resembles in general form that of the corresponding placental species, as the dog; a similar transverse condyle is placed low down, near the angle of the jaw; the strong coronoid process rises high above it, and is slightly curved backwards; there is the same well-marked depression on the exterior of the ascending ramus for the firm implantation of the temporal muscle, and the lower boundary of this depression is formed by a strong ridge extended downwards and forwards from the outside of the condyle. But in the dog and other placental digitigrade *Carnivora*, a process, representing the angle of the jaw, extends directly backwards from the middle of the above ridge, which process gives fixation to the articulation of the jaw, and increases the power by which the *masseter* acts upon the jaw. Now, although the same curved ridge of bone bounds the lower part of the external depression of the ascending ramus in all the marsupiata, it does not in any of them send backwards, or in any other direction, a process corresponding to that just described in the dog. The angle of the jaw is as if it were bent inwards in the form of a process encroaching in various shapes and various degrees of development, in the different marsupial genera, upon the interspace of the *rami* of the lower jaw. In looking down upon the lower margin of the jaw, we see therefore, in place of the margin of a vertical plate of bone, a more or less flattened surface extended between the external ridge and the internal process or *inflected* angle.

"The marsupial bones are elongated, flattened, and more or less curved, expanded at the proximal extremity, which sometimes, as in the Wombat, is articulated to the *pubis* by two points; they are relatively longest, straightest, and most slender in the Perameles; flattest, broadest, and most curved in the Koala. They are always so long that the cremaster muscle winds round them in its passage to the

testicle or mammary gland; and the uses of these bones immediately relate to those muscles.

"With reference to the interesting question—What is the homology or essential nature of the ossa marsupialia? I have, on a previous occasion, discussed that problem before the Zoological Society, and have not found reason to change the opinion I offered in 1835*; *viz.* that they belong to the category of the trochlear ossicles, commonly called sesamoid, and are developed in the tendon of the external oblique which forms the mesial pillar of the abdominal ring, as the patella is developed in the *rectus femoris*. They are not, however, merely subservient to add force to the action of the 'cremasteres,' but give origin to a great proportion of the so-called 'pyramidales.'

"The *osteogenesis* of the marsupial pelvis derives some extrinsic interest from the not yet forgotten speculations which have been broached regarding the analogies of the marsupial bones. These have been conjectured to exist in many of the placental Mammalia, with a certain latitude of altered place and form, disguised, e. g. as the bone of the *penis* in the Carnivora, or appearing as the supplemental ossicles of the acetabulum, which exist in the young of many of the Rodentia. In the os innominatum of the immature Potoroo, the curved prismatic *ilium* contributes to form by the outer part of its base the upper or anterior third of the acetabulum; the rest of the circumference of this cavity is completed by the *ischium* and *pubis*, excepting a small part of the under or mesial margin, which is formed by a distinct ossicle or epiphysis of the ilium, analogous to that described by Geoffroy St. Hilaire as the rudimental marsupial bone in the rabbit. Now here there is a co-existing marsupial bone: but besides the five separate bones just mentioned, there is a sixth distinct triangular ossicle, which is wedged into the posterior interspace of the ischio-pubic symphysis. How easy to suggest that this single symmetrical bone may be the representative of the *os penis* removed from the glans to the root of the intromittent organ! It is obviously a mere epiphysis of the ischium. The circumference of the acetabulum is always interrupted by a deep notch opposite the obturator-foramen, which is traversed by a ligamentous bridge, and gives passage to the vessels of the Harderian gland lodged in the wide and deep acetabular fossa.

* See the abstract of a Paper on the analogy of the *Dasyurus*, Proc. Zool. Soc., January 1835, in which the discussion of the question of the marsupial bone is abridged in the following words: "and Mr. Owen stated it to be his opinion, that the marsupial bones are essentially ossifications of the tendons of the external abdominal muscle which constitute the internal or mesial pillars of the abdominal rings." The same hypothesis is again advanced in the account of the anatomy of the Wombat. Proc. Zool. Soc. 1836, p. 49.

"In the great Kangaroo the fibula is a distinct bone throughout, but it is remarkably thinned and concave at its lower half, so as to be adapted to the convexity of the tibia, with which it is in close contact. In each of these genera therefore, in which locomotion is principally performed by the hinder extremities, fixity and strength is gained by the structure of the bones of the leg. In the other genera, as *Phascolarctos*, *Phascolomys*, *Phalangista*, *Petaurus*, *Didelphis*, and *Dasyurus*, the tibia and fibula are so connected together, and with the tarsus, that the foot enjoys a movement of rotation analogous to the pronation and supination of the hand; and in the Petaurists, Phalangers, Opossums, and Koala, the inner toe is so placed and organized as to perform the office of an opposable thumb, whence these Marsupiata have been termed pedimana or foot-handed. It is to this prehensile power that the modifications of the fibula chiefly relate. In the Wombat, Koala, Petaurists, and Phalangers it expands to nearly an equal size with the tibia at the distal extremity, and takes a large share in the formation of the tarsal joint; but the articular surface is slightly convex, while that of the tibia is slightly concave.

"The analogy of the carpal and tarsal bones is very clearly illustrated in the Wombat. The anchylosed *naviculare* and *lunare* of the hand correspond with the astragalus and naviculare of the foot, transferring the pressure of the *focile majus* upon the three innermost bones of the second series. The long backward projecting pisiform bone of the wrist closely resembles the posterior process of the *os calcis*; the articular portion or body of the *os calcis* corresponds with the cuneiform; the large unciform represents the cuboides, and performs the same function, supporting the two outer digits; the three cuneiform bones are obviously analogous to the *trapezium*, *trapezoides*, and *os magnum*.

"The commencement of a degeneration of the foot, which is peculiar to, and highly characteristic of, the Marsupial animals, may be discerned in the Petaurists, in the slender condition of the second and third toes, as compared with the other three. In the Phalangers, this diminution of size of the second and third toes, counting from the thumb, is more marked. They are also both of the same length, and have no individual motion, being united together in the same sheath of integument as far as the ungueal phalanges, whence the name of *Phalangista* applied to this genus. In the saltatorial genera of Marsupiata the degradation of the corresponding toes is extreme; but though reduced to almost filamentary slenderness, they retain the usual number of phalanges, the terminal ones being armed with

claws, which appear as appendages at the inner side of the foot, for the purpose of scratching the skin and dressing the fur."

November 13, 1838.—Professor Owen, in the Chair.

Professor Owen exhibited to the Meeting two skulls of the full-grown Koala (*Lipurus cinereus*, Goldf., *Phascolarctos*, Bl.), and two of immature specimens of the same species, and demonstrated the peculiarities of the *cranium*, and especially the condition of the *dental* system.

In both the adult *crania* the *dental formula* was as follows:

$$Incis.\ \frac{3-3}{1-1},\ canin.\ \frac{1-1}{0-0},\ præmol.\ \frac{1-1}{1-1},\ mol.\ \frac{4-4}{4-4} = 30:$$

it thus corresponds numerically with the formula of the genus *Hypsiprymnus*, and differs only in the absence of a few minute, inconstant, and functionless teeth from the dentition of many of the *Petaurists* and *Phalangers*. The true *molares* in the *Koala* are, however, relatively larger and stronger than in the *Potoroos* and *Phalangers*, yet present the same general structure; each molar is beset with four three-sided pyramids, the sharp apices of which soon become blunted by trituration, and the outer series in the upper grinders are the first to be worn down; the posterior grinder is a little smaller than the rest in the upper jaw; the true *molares* of the lower jaw are equal amongst themselves, but narrower than those of the upper jaw. The crowns of the *præmolares*, or false grinders, are subtriangular, broadest behind, compressed, and terminate in a cutting edge; those of the upper jaw have a ridge extended along the inner side of their base; they do not exceed in antero-posterior extent the crowns of the true grinders. The true *molares* of the upper jaw have four fangs; those of the lower jaw, and the *præmolares* in both jaws, have two fangs. The *canines* are situated close to the *maxillo-incisive* suture, distant from the *præmolares* half an inch; they are very small, and do not extend beyond the alveolar margin further than two lines; they terminate in an oblique cutting edge, and their simple fang is closed at its extremity. Two lines anterior to the *canines* begin the series of *incisors*, of which the four posterior ones are of the same size as the *canines*; the pair immediately behind the large anterior *incisors* have their crowns worn flat by the appulse of the two large *incisors* below. The two anterior *incisors*, upper jaw, are twice as long, and as broad and thick as the posterior ones; their crown is conical, slightly curved, subcompressed, beveled off obliquely to an anterior cutting edge, and having a partial coating of enamel, but differing from true *dentes scalprarii* in having the extremity of the fang contracted and closed. The two *incisors* of the lower jaw are longer, straighter, and more compressed than the cor-

responding pair above; the enamel is confined to the anterior and lateral surfaces of the crown; but this, though beveled off from behind forwards, terminates in a blunt apex by attrition against the small middle *incisors* of the upper jaw; the posterior surface of the crown is impressed with a narrow longitudinal groove. These *incisors*, like those above, are developed by a temporary pulp, and have the fang contracted and solidified. In this respect the *Koala* resembles the *Phalangers*, and differs from the *Potoroos*, which have the fang of the large anterior *incisors* open for the reception of a persistent pulp. In the compressed and sectorial structure of the *præmolares* of the *Koala*, we perceive, however, an evident transition to the characteristic form of these teeth in *Hypsiprymnus*; but in this genus the *præmolares* are still more compressed, and are remarkable for their antero-posterior extent, which dimension becomes excessive in the arboreal *Potoroos* of New Guinea.

So far, therefore, as the affinities of a Marsupial quadruped are indicated by its teeth, the position assigned to the *Koala* by Latreille*, viz. next to the *Phalangers*, must be regarded as more natural than that which it occupies in the 'Règne Animal' of Cuvier, viz. between the *Kangaroos* and *Wombat*. From the *Kangaroos* the *Koala* differs in the presence of *canines* in the upper jaw; and still more so from the *Wombat*, which has neither *canines* nor posterior *incisors*; whereas the *Koala* not only closely resembles the *Phalangers* and *Petaurists* in the correspondence as to number, kind, and conformation of its teeth, as compared with the functionally developed teeth of those genera, but also agrees with them in the conformation of its digestive organs, having a simple stomach, and a very long cæcum. In the *Wombat*, on the contrary, the cæcum is short and wide, and has a vermiform appendage. Both the *Potoroos* and *Kangaroos* differ from the *Koala* and *Phalangers* in their large sacculated stomach and relatively shorter cæcum; but the *Potoroos*, in the comparative simplicity of this organ, as well as in the presence of superior canine teeth, have clearly the nearer affinity to the *Koala*. Since, moreover, the *Petaurists* have canines in both jaws like the *Phalangers*, while the *Koala* possesses them only in the upper jaw, the place of the *Petaurists* should be between the *Phalangers* and *Koala*, and not, as in Latreille's system, between the *Kangaroos* and *Potoroos*; and Professor Owen proposed to include the *Koala* with the *Phalangers* and *Petaurists* in one subdivision, and to join the *Potoroos* with the *Kangaroos* to form another and distinct primary group of Marsupialia.

* Familles Nat. du Règne Anim. p. 53.

LINNÆAN SOCIETY.

April 16, 1839—The Lord Bishop of Norwich, President, in the Chair.

Read, "Remarks on British Lichens and Fungi, principally on species or varieties new to our Flora." By Churchill Babington, Esq.

The object of Mr. C. Babington in this paper is to give descriptions of some species or varieties of Lichens and Fungi hitherto unpublished in any British Flora, and also to communicate observations on the transit of monstrosities to their proper forms. The Lichens brought into notice as not yet introduced into the British Flora are, *Lecanora elatina*, Ach., from Rose Hall, Cumberland; *Stereocaulon denudatum*, Flörke, (confounded with *S. paschale*) from Scotland; *Lecidea nitidula*, Fries, also from Scotland; *Lecidea miscella*, Ach., as distinct from *L. miscella*, Eng. Bot.; *Biatora Krockiana*, Hoppe, from Isles of Rum and Skye; *Biatora anomala*, Fr., from Yoxall Lodge; *Opegrapha signata*, Ach., from Herefordshire; and *Verrucaria margacea*, Wahl., from Charnwood Forest. Among the Fungi are, *Agaricus Mariæ*, Klotsch; *A. serrulatus*, Fr.; *Thelophora ferruginea*, Pers.; *T. lactea*, Fr.: *T. lævis*, Pers.; *Peziza Ledi*, Alb. and Schw.; *Stictis lichenicola*, Mont.; *Sclerotium roseum*, Kneiff.; *Sphæria scoriadea*, Fr.; *S. mesiota*, Bab.; *S. rhytismoides*, Bab.; *S. arbuticola*, Fr.; *S. alnea*, Fr.; *S. ostruthii*, Fr.; *S. Depazea*, Fr.; *Depazea pyricola*, Desm.; *Dothidea chætomium*, Kunze; *Stemonitis pulchella*, Bab.; *Stilbum aurantiacum*, Bab.; *Syzygitis megalocarpus*, Ehrenb.; *Stilbospora macrosperma*, Pers.; *Coniothecium amentaceum*, Corda; and *Xenodochus carbonarius*, Schl.

Read, "On a Gall gathered in Cuba, by W. S. MacLeay, Esq., on the leaf of a plant belonging to the order *Ochnaceæ*." By the Rev. M. J. Berkeley, M.A., F.L.S.

The gall is remarkable for its very close resemblance in habit and form to some epiphytous Fungi, for possessing a distinct operculum, and, especially, for bursting through the cuticle, which surrounds it in the form of a few laciniæ at the base. Mr. Berkeley pointed out various forms of galls and other productions of insects which have been described as Fungi, but in none is the resemblance so striking as in the present. He regretted that he was not able to throw any light upon the animal by which it is caused, though he was able to state positively that it is an animal production, as in most instances decayed exuviæ were found in its cavity, and in one case a little imperfect grub, which was however unfortunately lost.

May 7, 1839.—The Lord Bishop of Norwich, President, in the Chair.

Read, "Supplementary Observations on the Development of the Theca, and on the Sexes of Mosses." In a letter to R. H. Solly, Esq., F.R.S. & L.S. By William Valentine, Esq., F.L.S.

The author commences his letter by stating that subsequent observations have induced him to concur entirely with the views of Professor Mohl as to the sporules of Mosses being developed by four in a mother cell, a fact which he was led to doubt in his former communication printed in the 17th volume of the Society's Transactions. The present paper contains a detailed account of the development of the theca in *Œdipodium Griffithianum*, which exhibits a beautiful example of the tetrahedral union of the sporules. In this moss the four sporules in each mother cell are piled on each other so as to form a cone with a triangular base, and they appear to be connected with each other in the young state by a very minute stalk which is situated at the conjunction of three radiating lines. This connexion is perhaps in most instances dissolved at an early period, and the sporules recede a little from each other, but are still kept in the triangular form by the mother cell. It is not uncommon however to find the connexion unbroken after the sporules have arrived at maturity, and in these instances there seems to be a general adhesion at the opposing faces of the sporules.

The author concludes his paper with some remarks on the analogy that exists between sporules and pollen, which he observes, is so remarkable, and the particulars so numerous, that the essential identity of the two can be scarcely a matter of opinion.

May 24, 1839.—The Lord Bishop of Norwich, President, in the Chair.

This day, the Anniversary of the birthday of Linnæus, and that appointed in the charter for the election of Council and Officers, the President opened the business of the Meeting, and in stating the number of Members whom the Society had lost during the past year, gave the following notices of some of them:

Samuel Brookes, Esq.—Mr. Brookes was devoted to the science of Conchology, and possessed a valuable collection of British and Foreign Testacea. He was the author of an Introduction to the Study of Conchology which appeared in 1815.

The Rev. Martin Davy, D.D., F.R.S., Master of Caius College, Cambridge.

The Rev. Richard Dreyer, LL.B.

John Lord Farnham.

Charles Holford, Esq.

Lawrence Brock Hollinshead, Esq.

John Hull, M.D.—Dr. Hull was ardently attached to the study of Botany, and in the midst of an extensive medical practice, he found occasional moments of leisure to devote to the cultivation of his favourite pursuit. We are indebted to him for the publication of a British Flora in 1799, of which a second edition appeared in 1808; and the Elements of Botany, in 2 volumes, 8vo, in 1800. These works, highly creditable to their author, tended to increase the taste for botanical pursuits.

Matthew Martin, Esq.—Mr. Martin reached the advanced age of 90. He became a Fellow of this Society in 1791.

George Milne, Esq.—Mr. Milne pursued with much ardour the study of Entomology for more than half a century, and his name is familiar to the cultivators of that branch of science in this country. He possessed an extensive cabinet of insects, particularly rich in British and Exotic Lepidoptera. He had retired from London for several years to his native place Johnshaven, Kincardineshire, where he died some months ago at an advanced age.

The Rev. Robert Nixon, B.D., F.R.S.

William Younge, M.D.—Dr. Younge was the early friend and a fellow student of our late distinguished President and Founder Sir J. E. Smith, and the companion of his tour on the continent in the years 1786 and 1787, of which an account appeared in three volumes 8vo, in 1793, and a second edition in 1807. Dr. Younge was elected a Fellow of this Society at its first institution in March 1788.

Amongst the Foreign Members occur *M. Frédéric Cuvier*, Member of the Academy of Sciences of the French Institute, the younger brother of the great Cuvier, and eminently distinguished as a systematic zoologist. He was the author of a work on the value of the teeth as affording zoological characters in the class mammalia, and of a number of valuable papers on Descriptive Zoology in the Annales et Mémoires du Muséum. He likewise wrote the principal part of the text to the Histoire Naturelle des Mammifères, a work which he had undertaken in conjunction with Geoffroy St. Hilaire. Among his last productions may be noticed his Mémoire sur les Gerboises et les Gerbilles, printed in the second volume of the Transactions of the Zoological Society of London. He was distinguished, like his brother, for his candour and frankness of character, and a total freedom from those petty jealousies which too often beset men of science.

M. Charles de Gimbernat.

Gaspard Count Sternberg, Founder and President of the Royal

Museum of Natural History at Prague, a distinguished patron of science, and author of a valuable original work on Fossil Plants, which were chiefly obtained from his own coal mines in Bohemia, and of an excellent Monograph of the genus *Saxifraga*, illustrated by coloured figures. To him we are indebted for the recovery of the vegetable treasures collected by Hænke in Peru, Cochabamba, and in the Philippines, whither he had accompanied the Spanish voyage of discovery under the celebrated, but unfortunate, Malaspina. These interesting plants have been published by Presl, under the auspices of Count Sternberg, in a work entitled 'Reliquiæ Hænkeanæ.' Count Sternberg was distinguished for his urbanity, hospitality, and an eager desire to promote every useful work. He left his collections and books of Natural History to the Museum already mentioned.

Among the Associates are the following:

Mr. John Hunneman.—Mr. Hunneman having been long the medium of communication between the botanists of this country and those of Germany, Switzerland, and Russia, our collections have been enriched through his means with a vast variety of new and interesting plants. A curious Mexican genus, belonging to the natural family *Papaveraceæ*, bears his name, and commemorates the services rendered by him to science.

Mr. George Penny.—He was well acquainted with the plants which he successfully cultivated, and was the author of the 'Hortus Epsomensis', and of several papers on Garden Botany in Mr. Loudon's Gardener's Magazine.

Mr. William Weston Young made the drawings for Mr. Dillwyn's valuable work on British Confervæ, and a series of drawings of British birds now in the possession of Mr. Yarrell.

The President also announced that twenty Fellows, five Foreign Members, and two Associates had been elected since the last Anniversary.

At the election, which subsequently took place, the Lord Bishop of Norwich was re-elected President; Edward Forster, Esq., Treasurer; Francis Boott, M.D., Secretary; and Richard Taylor, Esq., Under-Secretary. The following five Fellows were elected into the Council in the room of others going out, viz. W. J. Burchell, Esq., J. W. Lubbock, Esq., Hugh Duke of Northumberland, John Forbes Royle, M.D., and William Yarrell, Esq.

June 4, 1839.—Edward Forster, Esq., V.P. in the Chair.

Read, "Further Observations on the *Spongilla fluviatilis*, with some remarks on the nature of the *Spongiæ Marinæ*." In a letter to the Secretary, by John Hogg, Esq., M.A., F.L.S.

In the latter portion of this letter the author endeavours (in addition to what has been already stated at p. 58) to demonstrate the *vegetability* of the river sponge, from the following facts, which were obtained by many experiments made by him upon that substance during the last two summers.

1. From the general resemblance of the membrane which invests the soft portion or jelly with the membrane or cuticle of the leaves of many plants.

2. From this gelatinous or soft portion being so similar to the parenchymatous substance of the more fleshy kinds of leaves, and being, like the latter, chiefly composed of numerous pellucid globules.

3. From the green colouring matter or chromule contained in those globules, on being pressed out, giving a permanent green or yellowish-green colour to white paper, as is the case with the chromule of leaves and plants.

4. From strong acids having the same effects on this sponge as they are seen to have upon plants when they are macerated in them.

5. From the mode in which numerous bubbles of gas, most probably oxygen, are disengaged from the surface of the living mass of *Spongilla*, when exposed to the brightest solar light, being so extremely analogous to that which is known to occur with the leaves of a plant when immersed in water and submitted to the direct action of the light of the sun.

As to the currents of water which take place in the *Spongilla fluviatilis*, and are so similar to those which have been noticed by Dr. Grant and other authors in the sea sponges, and relied upon by them as the best evidence of their supposed animal nature, Mr. Hogg has, after many careful experiments, never been able to witness them taking place in any specimens which have been entirely destitute of every parasitical insect or other animal; he therefore concludes that these currents are caused by some insect, or crustacean, or molluscan, which is seen so generally to inhabit nearly every specimen of the *Spongilla*; and by means of the animal's performing the function of respiration, the streams or currents of water are found to enter into and flow out from the pores or oscules of that structure. But if on future investigations it shall be proved that these currents do occur in such individual masses of the *Spongilla fluviatilis* as are quite free from every parasite, Mr. Hogg would then consider that they are effected by the same agents as cause the motions or circulation of the fluids in vegetables, and most probably by an endosmosis and exosmosis of different fluids, in accordance with the important discoveries of M. Dutrochet.

The author has not perceived any trace of animal organization, or the least symptom of sensation, or any powers of contraction and dilatation in this species of sponge, although he has applied to it, when in a fresh and vigorous state, several sorts of powerful stimulants.

He next showed that no arguments in support of the fancied animality of the *Spongilla* can be brought forward, either from its smelling like carrion or animal matter, or from numerous spiculæ being present in its composition. And the manner in which he raised young *Spongillæ* from the seed-like sporidia and locomotive sporules makes it perfectly conclusive that this freshwater sponge cannot be, as Montagu supposed, the nidus of some aquatic insect, although such an opinion might, without those successful experiments, have been somewhat confirmed by the author's discovery of an unknown and anomalous insect, which he has at present only observed inhabiting this production. Some specimens of this small insect were exhibited, and presented to the Society.

Mr. Hogg concluded his letter with some general remarks on the nature of the *Spongiæ marinæ*. He stated that hitherto he had always accounted these substances as being principally composed of an animate or live jelly, which was endowed, as some authors affirmed, with a certain degree of palpitation and contraction, and dilatation, and consequently had, fourteen years ago, instituted for them an order "*Gelatinifera*," which he arranged the last among the *Polyparia Composita*. That on becoming convinced by his late researches on the river sponge of its vegetability, he began in some measure to concur in the opinion of Montagu, that that substance might probably be quite distinct from the sea sponge, and to think that the latter might still be of an animal nature; but, on a more recent examination and comparison of the *Spongilla* with many of the *Spongiæ*, he has found that there exist no real grounds for that opinion, and that there scarcely is even a generic difference between them.

The author then compared the freshwater sponge with the sea sponge, and showed, among other extreme resemblances in their structure and composition, that many of the latter possess similar seed-like bodies or sporidia, as well as the locomotive germ-like bodies or sporules which have been described by Dr. Grant.

Mr. Hogg concludes, if the currents of water do flow in and issue out from the sea sponge, independent of the function of respiration of any marine insect or parasitical animal nestling within it, that then they are caused by the same means which effect the motions of fluids in plants, and that these currents convey nutriment to the inner parts of the sponge, after the same manner as food is supplied

to all vegetables. He observed that neither the odours of the fresh, dried, and burnt sponges, nor the presence of ammonia in them, afforded proofs of their animality, and that there really is no more peculiarity in their chemical composition than what likewise exists in that of certain plants.

Mr. Hogg therefore maintains it to be impossible to account the *Spongilla* as belonging to the vegetable kingdom and the *Spongia* to the animal; and since he has become sure of the former, and since the *Spongia* is now known to possess neither one organ nor a single property peculiar to an animal, he has been at length forced to acknowledge the vegetable nature of the *Spongia*.

Moreover, the fact of Dr. Grant having witnessed the locomotive sporules of some of the sea sponges germinating and developing themselves after the forms of their parent structures, at once decides that they cannot be the nidus or matrix, or the fabrication or production of any marine animal.

Lastly, Mr. Hogg, considering to what order of plants the fresh-water and the sea sponges should be referred, proposed to classify them in a separate order "Spongiæ," which ought to be placed between the order Fungi and that of the Algæ.

MISCELLANEOUS.

ON THE STRUCTURE OF THE *VOLVOCINÆ*.

M. Ehrenberg observes, "that with respect to the organization of the genus *Volvox*, all endeavours to acquire some knowledge of it have only proved successful, now that observation has been at last directed to the right depth (1833). Formerly the entire globule was generally regarded as a single verrucose or ciliated animalcule, and its bursting considered as the reproduction of simple individuals. But this view leads to wonders and to contradictions; it is evidently erroneous, and the organic relations lie much deeper. Each globule is a hollow *monadier* (Monadenstock) of many hundreds, nay, thousands of minute animalcules; and within this, several smaller globules are developed, which however are not single individuals, but also *Monadiers*. The single animals are those small greenish warts or points on the surface, and they resemble the Monads. Each animalcule bears precisely the same relation as a single animal of *Gonium pectorale*; it possesses a gelatinous shield open anteriorly, which when full-grown it can leave, and is connected by three to six thread-like tubes with the neighbouring individuals. It is evi-

dently then quite erroneous to compare the green bodies of *Gonium* or of *Pandorina* with the larger inner globules of *Volvox*; they are to be compared with the minute outer granules on the surface: and though *Volvox* is much larger than *Gonium* in its aggregate state, yet the individual animals are much smaller. In these small animalcules, which appear in the form of very minute green warts on the periphery of the *Volvox*-globule, and to which little attention has hitherto been paid, I have succeeded, by a laborious research, in recognising relations of structure which coincide entirely with those peculiar to the family of Monads."

For the details of structure of these highly interesting Infusoria we must refer the reader to Ehrenberg's work, 'Ueber die Infusionsthierchen', whence this extract is taken; and we may merely state that this illustrious naturalist succeeded in discovering nutritive organs, mouth, eyes, generative organs, &c.

DEVELOPMENT OF THE *LEGUMINOSÆ*.

Drs. Schleiden and Vogel draw from their interesting observations on the development of this large family of plants published in the 'Acta Acad. C. L. C. Nat. Cur.' vol. xix. p. 1. the following conclusions:

1. The flowers of the *Leguminosæ* are at their origin perfectly regular.

2. The subsequently cohering parts originate as free points, are developed free, and cohere subsequently.

3. All the parts of the flower are at their first appearance green leaves.

4. Even in the earliest stage only one carpellary leaf is visible in the *Leguminosæ*, which is open in the direction of the axis.

5. The anthers are formed from leaves, the inner cellular tissue being converted in part into pollen; and the loculi originate at both sides of the margin of the leaf, which is subsequently changed into the bursting rima.

6. The ovules are formed alternately at the upper margin of the ovarium, and consist of the nucleus and generally of two integuments, rarely of an integumentum simplex.

7. The ovules of the *Papilionaceæ* are hemitropous.

8. The embryo originates from the pollen tube at the micropyle end of the embryonal sac, and increases either from this place towards the chalaza, or (being propelled by the pollen tube, which has become cellular, to the centre of the embryonal sac), both in the direction of the chalaza and that of the micropyle.

9. The epidermis of the seed is formed in the *Leguminosæ* only of one integument, which, however, always separates into several layers.

10. No *endopleura tumida* exists in the *Leguminosæ*; what has been considered as such is albumen, and in fact *endosperm*.

The authors have also discovered that the ovules of the genus *Lupinus* are only provided with a simple integument, while those of the other *Leguminosæ* always possess a double one.

ON THE STRUCTURE OF THE SCALES OF FISH AND REPTILES.

M. Mandl, in a memoir presented to the French Academy, states that the scales are composed of a superior and of an inferior layer. The upper layer is composed, *a.* of longitudinal canals, proceeding in the form of longitudinal lines, from a point which is not always the centre of the scale; *b.* of cellular lines, i. e. of lines in which he thought he perceived the margins of successive layers of increase, but which, according to his observations, were nothing more than lines produced by the union or fusion of cells; *c.* of yellow corpuscles analogous to the corpuscles of bones, and of cartilages containing salts like them; *d.* of a focus occupied by interrupted cellular lines, by imperfect cells and corpuscles, &c.: the focus appears to be the first rudiment of the scale; *e.* of the teeth of the scale, which exist only on the terminal margin in the Acanthopterygians and are wanting in the Malacopterygians.

The inferior layer is composed of fibrous lamellæ, of which the outer ones are the longest. The elements of the fibrous layers, which in hard scales frequently shine through the superior layer, may be isolated by rupture.

The author concludes from his observations that the scales cannot be regarded as simple products of secretion, but that a true organization must be admitted in them. M. Mandl also considers with M. Agassiz that the scales may serve as characters in classification. —*Comptes Rendus*, June 24, 1839.

LEMNA ARRHIZA.

J. F. Hoffmann has instituted a series of observations to prove that *Lemna arrhiza* is a constant species; he observed the plant for two years separated from all foreign mixture, and never saw individuals produced which were of a different species. He also observed for several years the other common species of *Lemna*, and never found anything that could be compared to *L. arrhiza*, nor have any intermediate forms been discovered.—*Tijdschrift v. naturl. Geschiedenis en Physiol.* iv. p. 282.

DISCOVERY OF MUMMIES AT DURANGO, MEXICO.

A million of mummies have lately been discovered near Durango, in Mexico. They are in a sitting posture, but have the same wrappings, bands, and ornaments as the Egyptians; among them was found a poignard of flint, with a sculptured handle, chaplets, necklaces, &c., of alternately coloured beads, fragments of bones polished like ivory, fine worked elastic tissues, moccasins worked like those of our Indians, bones of vipers, &c. A fact of importance is stated; that the necklaces are of a marine shell found at Zacatecas, on the Pacific, where the Columbus of their forefathers probably therefore landed from Hindostan or from the Malay, or Chinese coast, or from their islands in the Indian ocean.—*Silliman's American Journal*, April, 1839.

EXPERIMENTS ON THE OLFACTORY SENSE OF THE ANTENNÆ. BY M. A. LEFEBVRE.

The observations of the author were first made upon a bee which was feeding upon a piece of sugar. Having moistened a long needle with æther, he approached it gently to the sugar; but the extremity of the instrument had hardly come within a few lines of the insect when it showed great uneasiness, and did not cease agitating its antennæ whilst directing them towards the odorous body. The bee, on the contrary, was not at all affected when M. Lefebvre touched the piece of sugar with a needle which had not been dipped in æther, or with a match, &c. "After having given the insect some moments of rest," says the author, "I again plunged my needle into the æther, and, hoping to accustom it to this penetrating smell, I approached the needle softly to its anal extremity. The bee did not move, but continued eating. Encouraged by this success, I slid the point of my needle along the body against the feet, but without touching the stigmata; I even deposited a little drop of the liquid there, and I did all this without the bee's appearing in the least uneasy. My surprise was very great to see that the insect suffered nothing in the neighbourhood of the stigmata, but as soon as I sought to pass the fore feet, the antennæ, by being lowered, obstructed my progress.

"I began again, and in advancing along the back from the hinder to the fore part, there was the same immoveableness as long as I went no further than the abdomen; but as soon as I arrived above the thorax the antennæ were suddenly thrown over, agitated and trembling with anger." M. Lefebvre subsequently made some experiments on wasps; he cut off the antennæ of these insects at different lengths, and made himself sure by means of æther, that a slight section at the extremity of these organs is sufficient to produce

a more or less complete loss of smell. The deprivation of the last joint of the antennæ suffices to cause the loss of this sense.—*Extract from the Annales de la Société Entomologique de France*, 1838, 3rd Part.

GEOGRAPHICAL DISTRIBUTION OF PALMS.

M. v. Martius has published an elaborate treatise on the geographical distribution of palms, which he divides into five groups, viz. *Arecinæ*, *Lepidocaryinæ*, *Borassinæ*, *Coryphinæ*, and *Coccinæ*. The distribution of the palms with which we are at present acquainted is as follows:

	Old World.	New World.	Total.
Arecinæ	53	45	98
Lepidocaryinæ....	60	7	67
Borassinæ	11	24	35
Coryphinæ	33	24	57
Coccinæ	2	99	101
	159	199	358

Of these 358 palms Europe contains 1, New Holland 6, New Zealand 1, Oceania 2, Africa 13, Asia 131, and America 198.

METEOROLOGICAL OBSERVATIONS FOR JUNE, 1839.

Chiswick.—June 1. Overcast: fine. 2. Dry haze. 3. Foggy: rain. 4. Foggy: cloudy. 5. Very fine: heavy rain at night. 6. Very fine. 7. Rain. 8—13. Very fine. 14—15. Hazy. 16. Very fine. 17. Very fine: thunder at night. 18. Slight haze: cloudy, with thunder. 19. Very fine: lightning at night. 20. Very hot. 21. Cloudy and fine. 22. Showery. 23. Stormy with rain. 24. Cloudy. 25. Very fine: rain. 26. Sultry: thunder. 27. Fine. 28. Thunder showers. 29, 30. Cloudy and cold.

Boston.—June 1, 2. Cloudy. 3. Rain: rain early A.M. 4, 5. Cloudy. 6. Fine: 3 o'clock P.M. therm. 72°. 7. Cloudy: rain P.M. 8—10. Fine. 11. Cloudy. 12. Fine. 13. Cloudy: rain P.M. 14. Rain: heavy rain with lightning early A.M.: rain again A.M. and P.M. 15—17. Cloudy. 18—20. Fine. 21. Cloudy: rain early A.M. 22. Fine: rain A.M. and P.M. 23. Cloudy: rain P.M. 24. Fine: rain early A.M. 25. Fine. 26. Rain. 27. Cloudy; rain P.M., with clap of thunder. 28. Rain. 29. Cloudy: rain P.M. 30. Cloudy.

Applegarth Manse, Dumfries-shire.—June 1, 2. Dry and withering. 3. Getting cloudy. 4. Very warm: air electrical. 5. Cleared up: soft and warm. 6. Pleasant day: moderate breeze. 7. Gentle rain all day. 8. Fair and droughty. 9. Fine day, but parching. 10. A welcome rain P.M. 11. Fine growing day: ground refreshed. 12. Genial rain: vegetation strong. 13. Rather cool A.M.: rain P.M. 14. Fair: growing day. 15, 16. Very warm and genial. 17. The same: thunder and rain P.M. 18. Very warm, but getting cloudy. 19. The same: rain P.M. 20. The same: getting cloudy. 21. Rain nearly all day. 22. Rain, soft and genial. 23. Showery all day. 24. Dull day, but kept dry. 25. Fine summer day. 26. Cloudy morning: cleared up. 27. Thunder, with heavy showers. 28, 29. Fair: temperature cool. 30. Beautiful summer day.

Sun shone out 26 days. Rain fell 10 days. Thunder 2 days.

Wind southerly 12 days. Westerly 6 days. Easterly 6 days. Northerly 6 days.

Calm weather 9 days. Moderate 12 days. Brisk 8 days. Boisterous 1 day.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. ROBERTON; *by* Mr. THOMPSON *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. VEALL *at Boston, and by* Mr. DUNBAR *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1839. June.	Barometer.						Thermometer.									Wind.				Rain.				Dew point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc.			Chiswick.		Boston. 8½ a.m.	Dumfries-shire.			London: Roy.Soc. 9 a.m.	Chiswick 1 p.m.	Bost.	Dumfries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	8½ p.m.	Fahr 9 a.m	Self-register. Max.	Min.	Max.	Min.		9a.m.	9pm.										
1.	29·964	29·969	29·927	29·58	30·07	30·03	55·2	55·7	48·2	71	45	52	52	44	N.	E.	NE.	NE.	…	…	…	…	52
2.	29·906	29·906	29·810	29·45	29·95	29·87	53·7	68·0	45·6	64	46	51	53	46½	NE.	SE.	calm	E.	…	·33	…	…	48
3.	29·694	29·708	29·647	29·23	29·75	29·70	50·8	51·3	47·0	66	49	48	53½	48	ENE.	S.	E.	E.	·227	·20	·22	…	48
☾ 4.	29·666	29·736	29·654	29·15	29·69	29·67	54·6	54·7	50·3	66	46	53·5	59	56	E.	NE.	calm	W.	·069	…	·10	…	51
5.	29·836	29·903	29·822	29·25	29·76	29·83	59·3	61·7	53·3	72	46	57·5	60½	57	N.	S.	calm	W.	…	·64	…	0·40	52
6.	29·970	29·950	29·937	29·38	29·83	29·80	63·9	57·9	54·2	71	53	65	63	55½	S.	SW.	calm	W.	·227	·02	…	…	55
7.	29·848	29·843	29·393	29·19	29·63	29·63	60·3	69·3	56·3	64	49	61	57½	57	E.	S.	calm	W.	·033	·17	…	…	56
8.	29·898	29·901	29·850	29·27	29·69	29·72	63·2	63·7	55·9	72	52	65	59	53½	SE. var.	S.	SW.	S.	·091	…	·09	…	56
9.	30·058	30·215	30·016	29·40	29·70	29·95	63·8	85·0	56·0	72	48	65	58	52	S.	S.	W.	S.	…	…	…	…	57
10.	30·318	30·291	30·236	29·68	30·06	29·93	63·9	71·2	55·5	71	56	64	59	53	SW.	SW.	W.	S.	…	…	…	…	56
● 11.	30·262	30·270	30·223	29·55	30·05	30·17	64·7	70·0	59·4	70	49	66	59	56	W.	W.	W.	W.	…	…	…	…	59
12.	30·244	30·225	30·002	29·55	30·04	30·07	67·3	80·7	57·8	81	56	68	53	49	S.	S.	SW.	NE.	…	…	…	1·06	59
13.	29·944	29·911	29·870	29·40	30·05	30·05	72·0	78·3	62·2	81	53	58	56½	48	NE.	E.	E.	NE.	…	…	…	…	65
14.	29·866	29·889	29·846	29·42	30·03	30·02	58·2	77·6	55·3	64	55	51	53	50	NE.	E.	E.	E.	…	…	·87	…	57
15.	29·946	30·171	29·929	29·47	30·03	30·13	58·4	64·4	55·7	63	47	52·5	60½	59	NNW.	NE.	calm	S.	…	…	1·28	…	58
16.	30·268	30·279	29·936	29·77	30·23	30·25	61·3	65·0	49·0	73	50	56	65	63	NE.	E.	calm	S.	…	…	…	…	53
17.	30·200	30·195	30·093	29·72	30·24	30·11	64·2	70·3	52·5	75	54	57	71	65	ENE.	NE.	calm	SSE.	…	…	…	…	58
☽ 18.	30·054	30·025	29·940	29·46	29·99	29·92	70·6	83·6	61·6	84	58	66	69½	63	E.	SE.	calm	S.	…	·16	…	…	65
19.	29·998	30·140	29·948	29·33	29·89	30·00	66·6	82·3	62·0	76	45	68	62	62	S.	SW.	W.	S.	·050	…	…	…	62
20.	30·158	30·134	29·857	29·53	30·08	29·95	67·8	85·0	58·5	83	59	70	59	63	S.	SE.	calm	E.	…	·01	…	0·97	62
21.	29·818	29·807	29·764	29·10	29·68	29·60	68·3	76·2	61·0	72	56	65	57	50½	S.	SW.	calm	NE.	·033	…	·02	…	62
22.	29·644	29·642	29·409	29·03	29·46	29·26	63·9	73·6	59·9	66	55	65	60	53½	S.	S.	SW.	SE.	…	·11	…	…	60
23.	29·456	29·702	29·414	28·78	29·23	29·42	62·8	70·0	56·8	65	54	61	54	53	SE. var.	SW.	W.	SW.	·111	·18	·25	…	57
24.	29·842	29·896	29·797	29·16	29·52	29·74	63·4	76·4	55·6	70	54	62	56	58	S.	SW.	W.	W.	·319	…	·01	…	58
25.	29·968	29·943	29·661	29·36	29·82	29·80	64·3	69·3	57·4	74	55	63	61	54	S.	S.	calm	S.	…	·07	…	…	57
○ 26.	29·552	29·566	29·470	29·06	29·67	29·64	63·4	70·4	56·0	72	51	59	50	54	E.	SW.	calm	E.	…	·51	·16	…	58
27.	29·892	29·861	29·743	29·27	29·72	29·72	62·8	68·6	54·2	70	50	62	58	48	W.	SW.	calm	SE.	·083	·20	·41	1·10	57
28.	29·684	29·841	29·663	29·14	29·77	29·89	61·3	81·2	54·7	54	49	55	56	51	S.	W.	calm	E by N.	·133	·40	·25	…	57
29.	29·956	30·139	29·944	29·46	30·05	30·17	53·7	54·0	50·3	51	41	54	53	48	WNW.	N.	N.	N.	·144	…	·85	…	52
30.	30·158	30·285	30·150	29·68	30·19	30·20	53·3	53·8	45·8	56	40	51	56	54	W.	NW.	N.	N.	…	…	·07	…	46
Mean.	29·936	29·978	29·831	29·36	29·86	29·87	61·9	70·2	54·9	68·30	50·70	59·7	58·1	54·1					Sum. 1·520	3·00	4·58	3·53	Mean. 56·4

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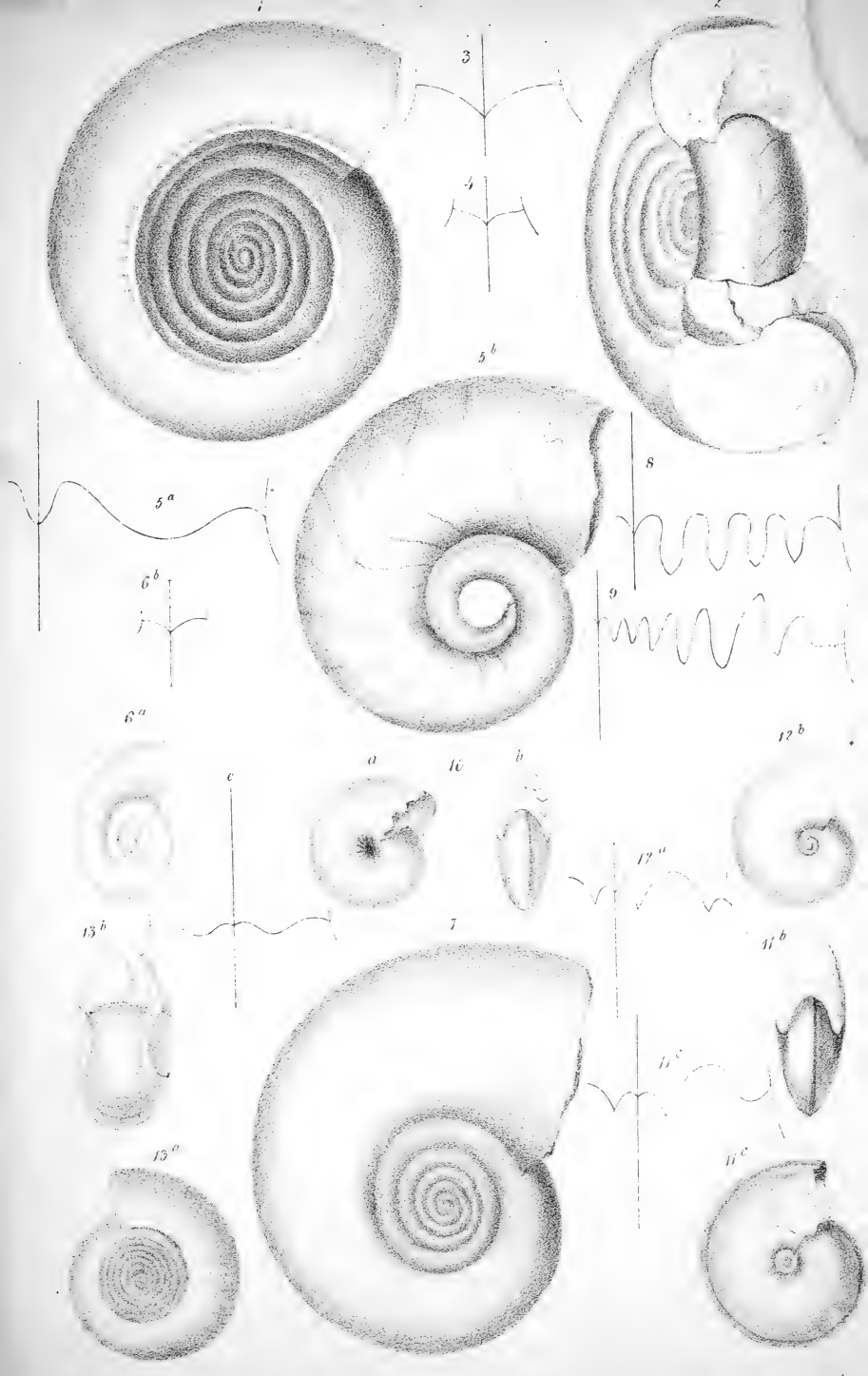

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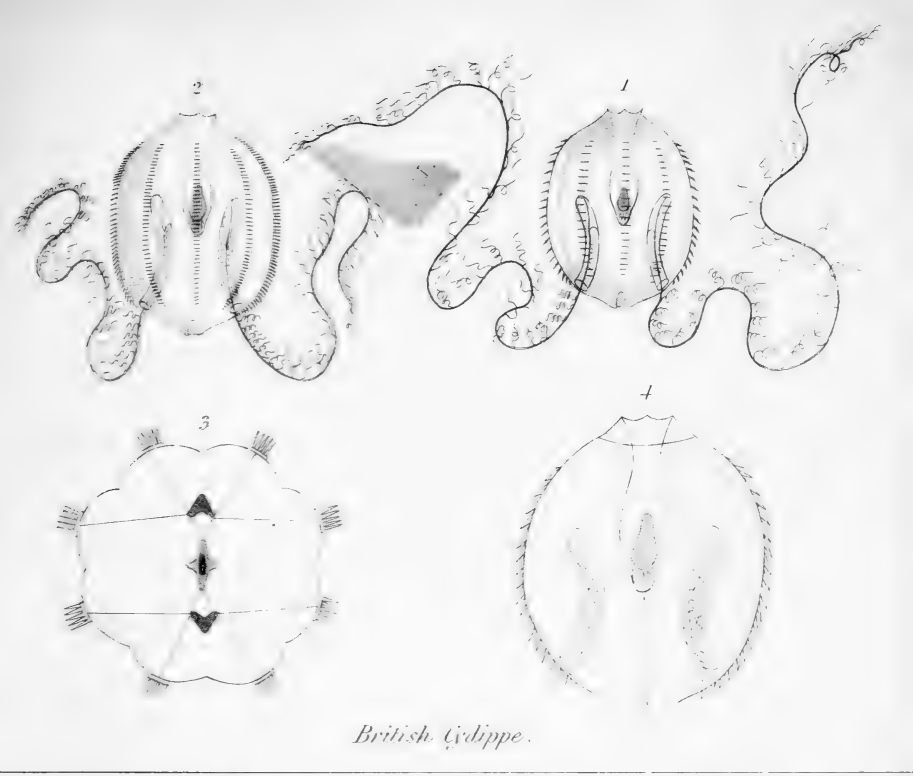

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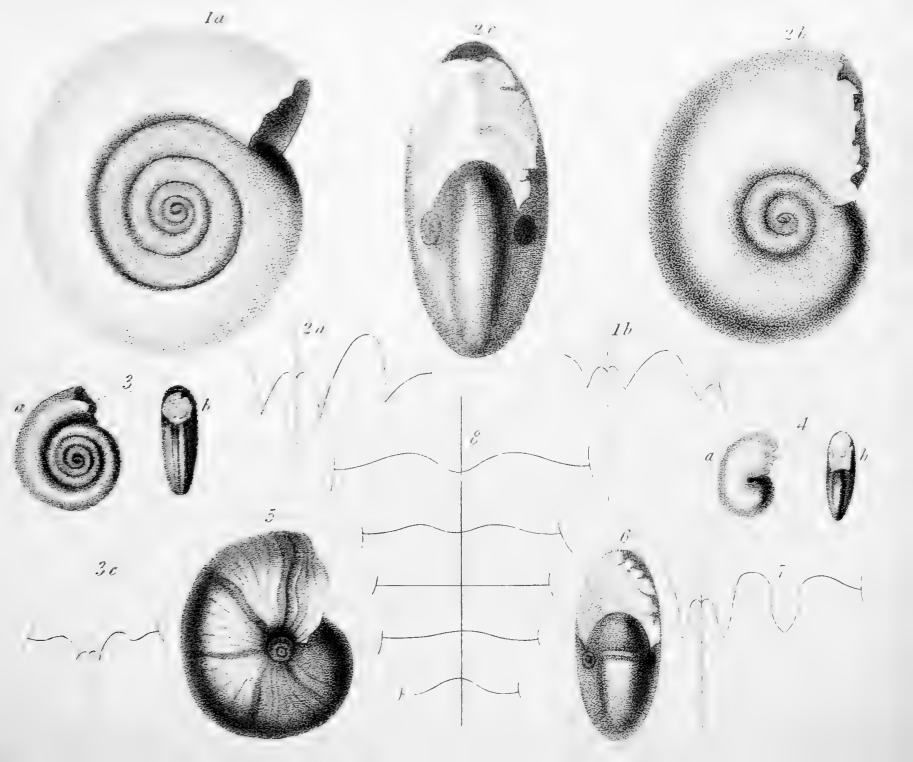

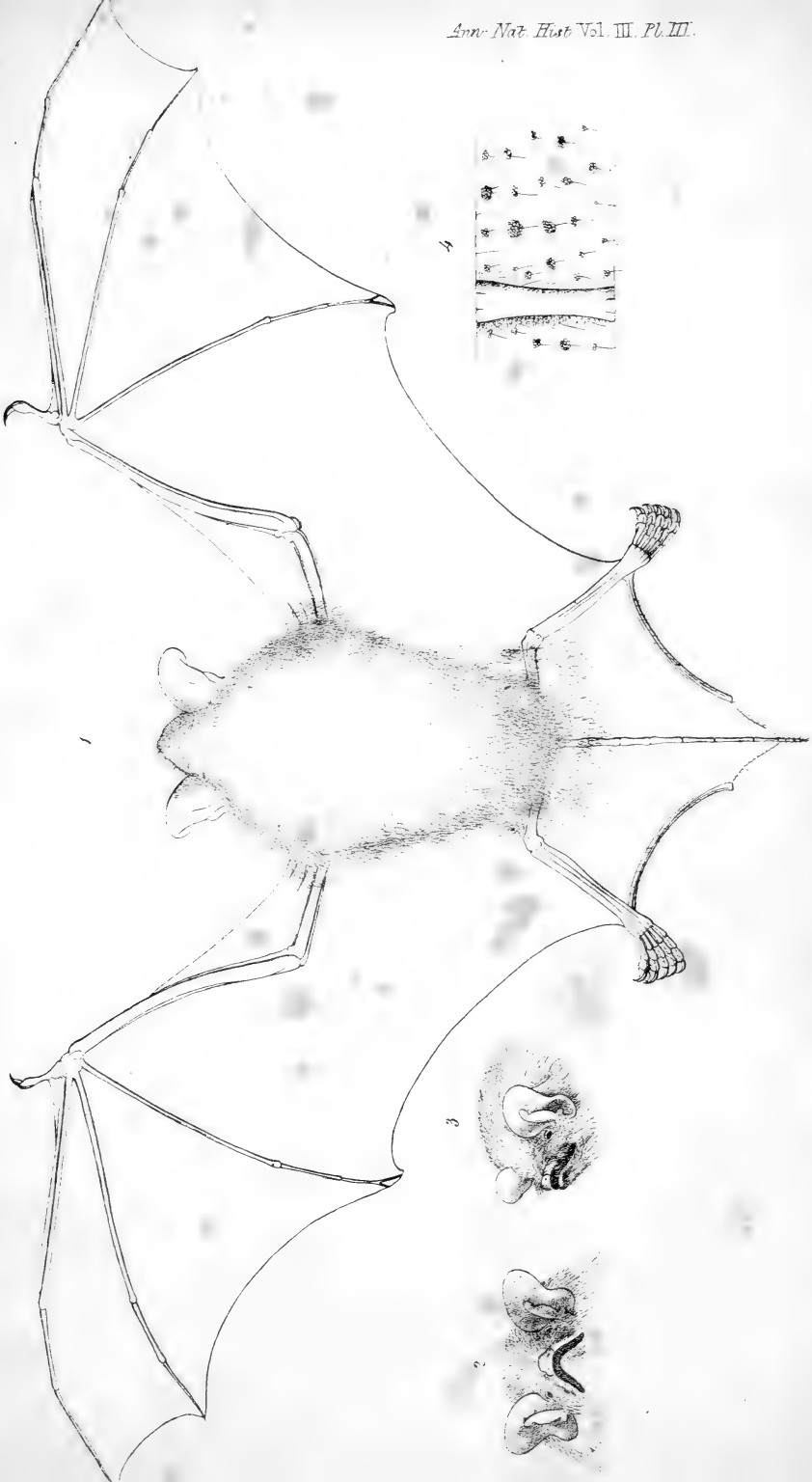
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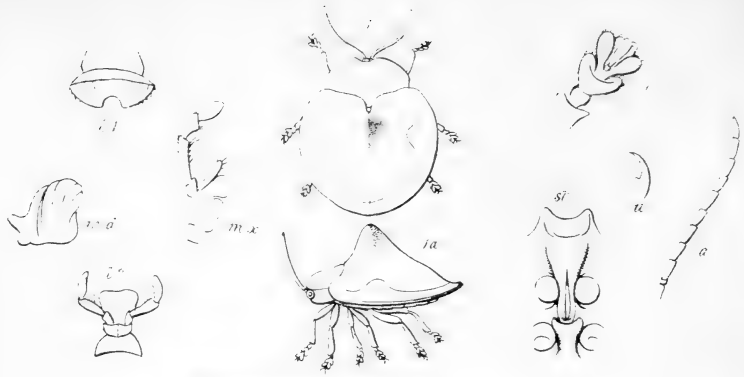
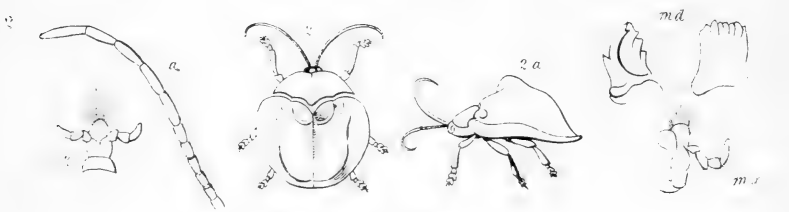
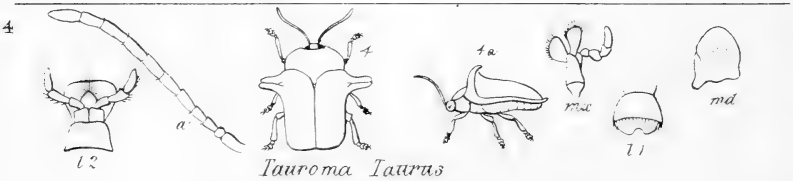
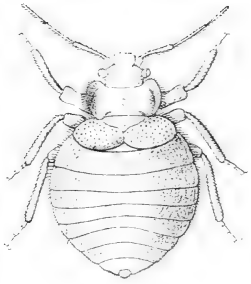


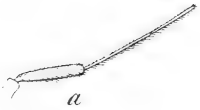




J. O. Westwood del. J. Basire, lith.

Fig: 1.





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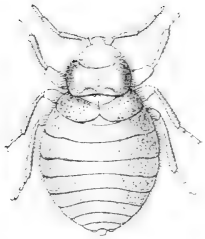
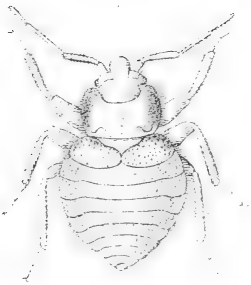
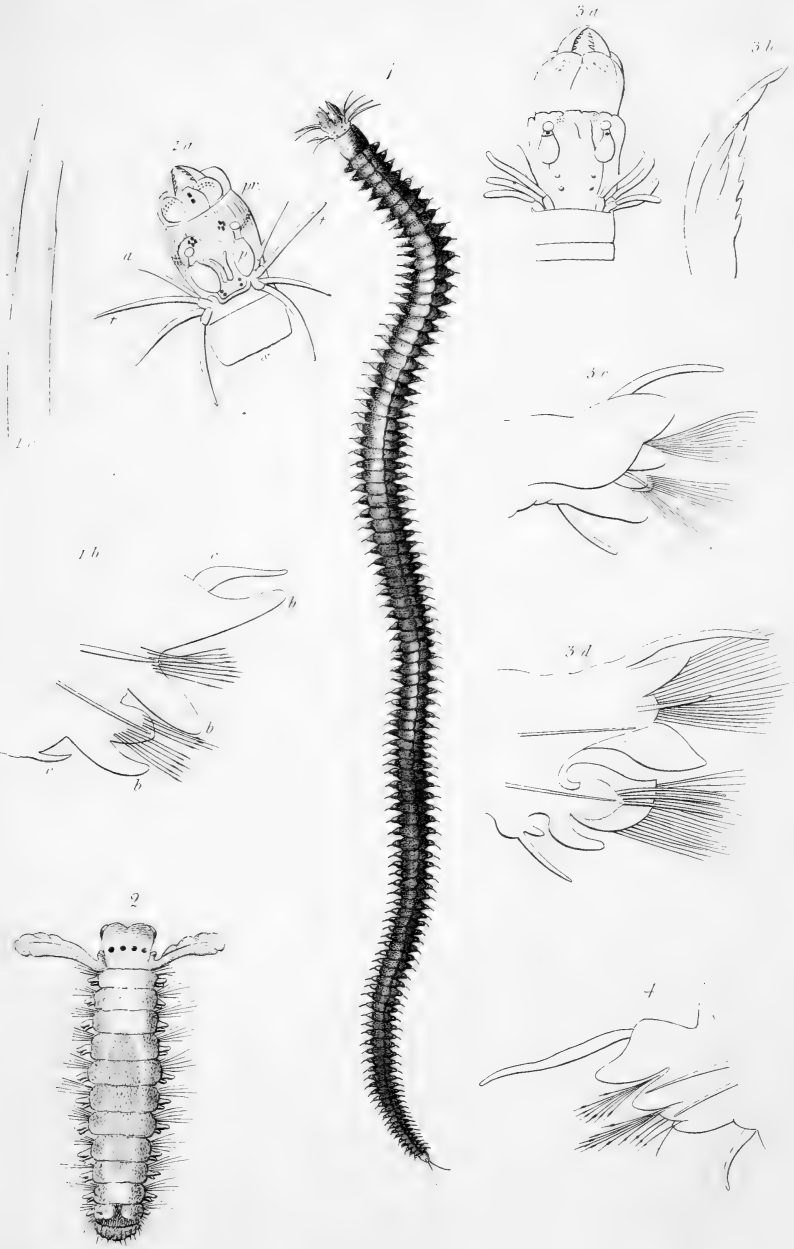


Fig 3.



1. Cimex columbarius. 2 C. Hirundinis. 3 C. Pipistrelli.

Chas. M. Curtis, del. J. Basire, Sculp.

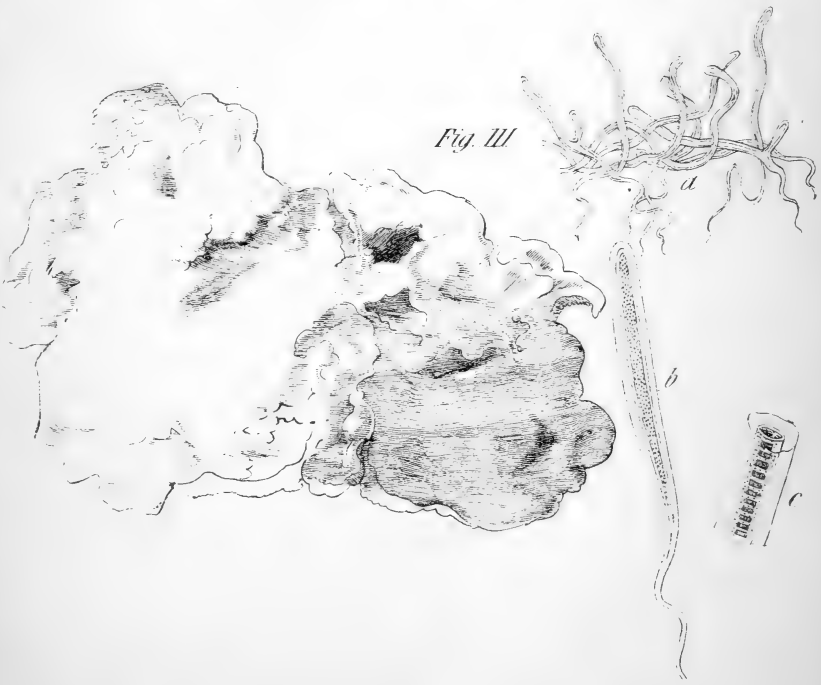


British Nereides.

Fig. I.

Fig. II.

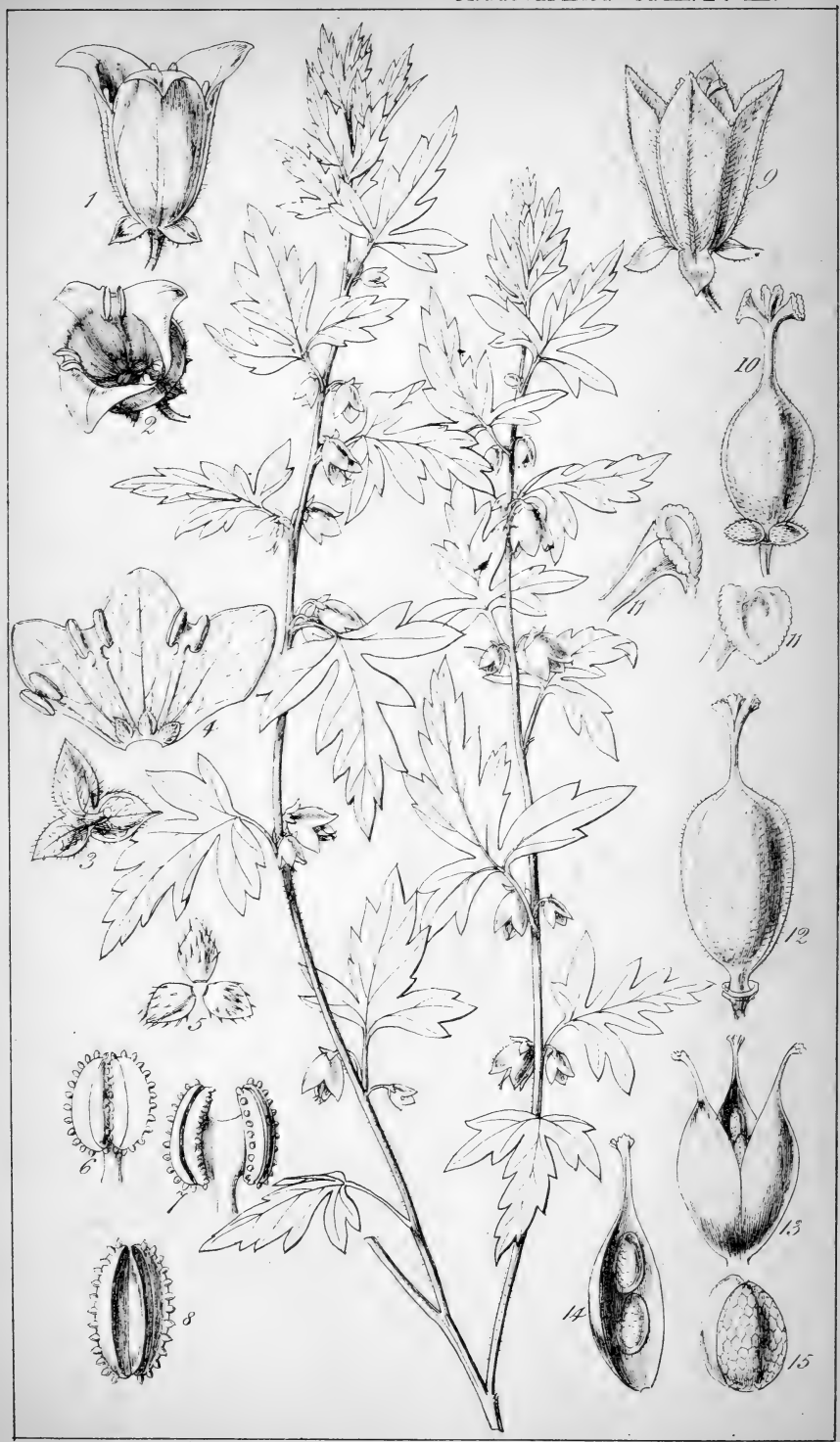
Fig. III



Allen & Ferguson lith.

Polyporus australis.

Allan & Ferguson lith.



Hon. W.E. Harvey Del.

Allan & Ferguson Lith.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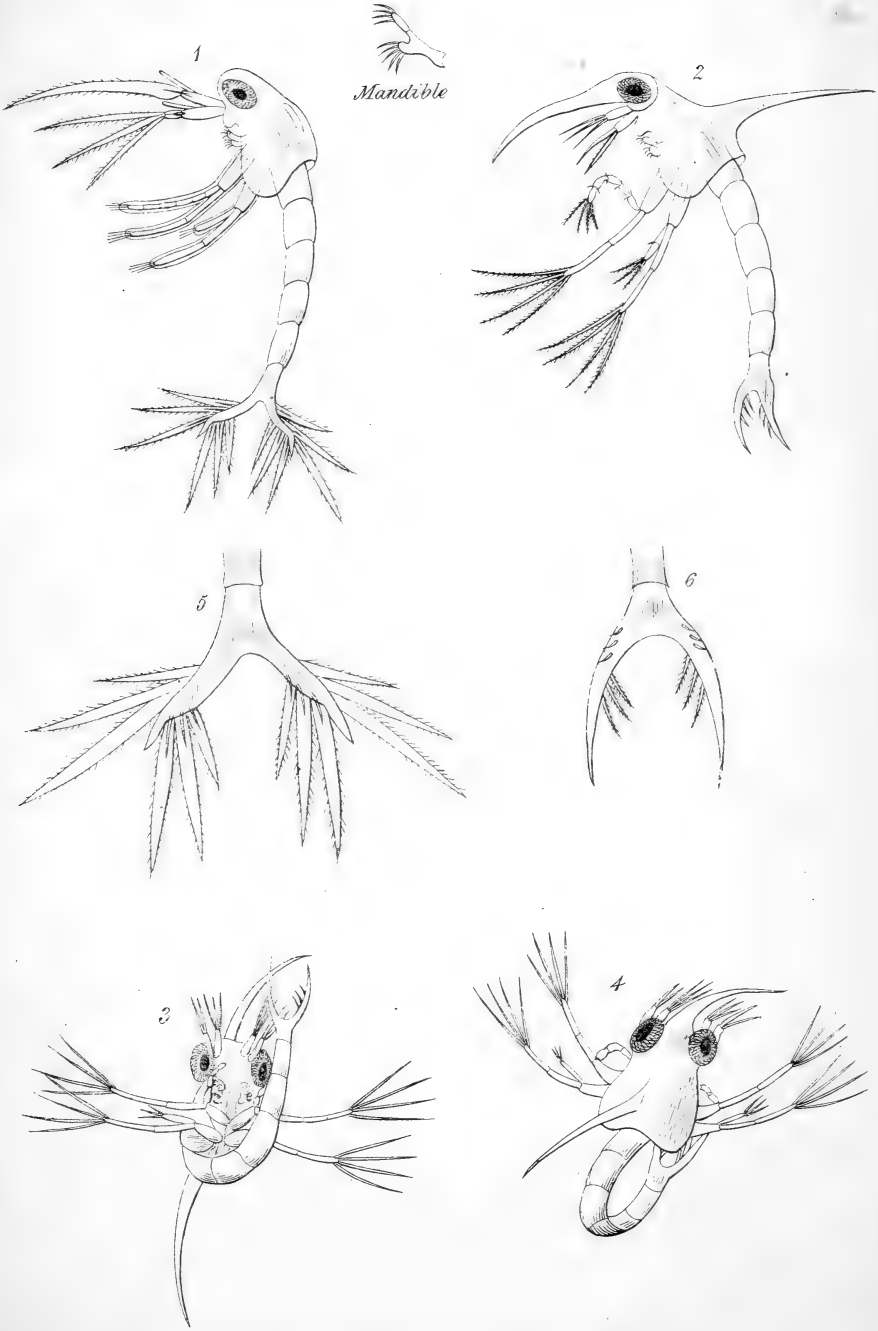

Larva of Carcinus Mœnas.

J. Basire, lith.

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MARCH 1839.

WITH A PLATE
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ERRATUM.

An error in the names affixed to two notices in our last Number, p. 142, requires correction to prevent confusion. For the first, on *Carex rupestris*, we are indebted to Mr. Churchill Babington;—and for the second, upon the Hare and the Alpine Swift, to our old correspondent Mr. Charles C. Babington, F.L.S.

Page 139, line 11 *from bottom, omit the words* "in conjunction with Prof. Müller."

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